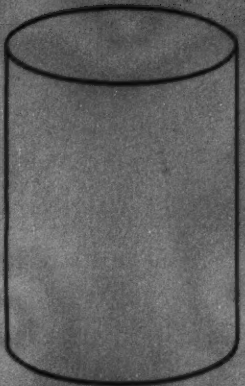
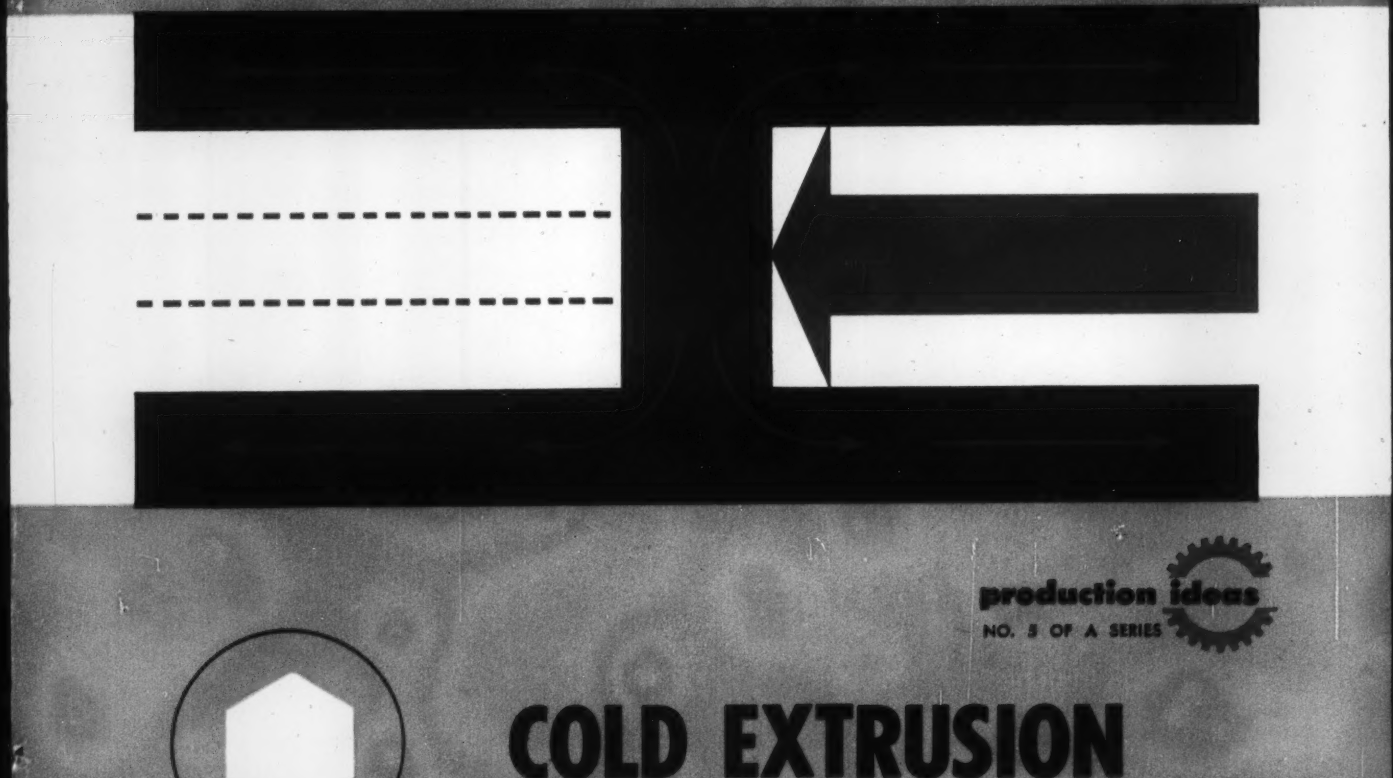
NOVEMBER 5, 1956

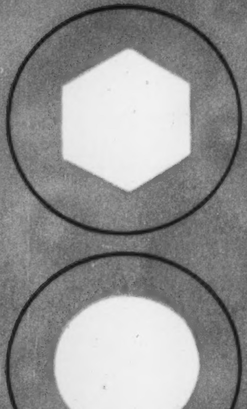
STEEL
The Metalworking Weekly

A PENTON PUBLICATION





production ideas
NO. 5 OF A SERIES



# COLD EXTRUSION
## Tools Up for Production

—page 107

✓ '57 Construction: $48 Billion High?
—page 65

✓ Demand Cuts Into Metal Stocks
—page 177

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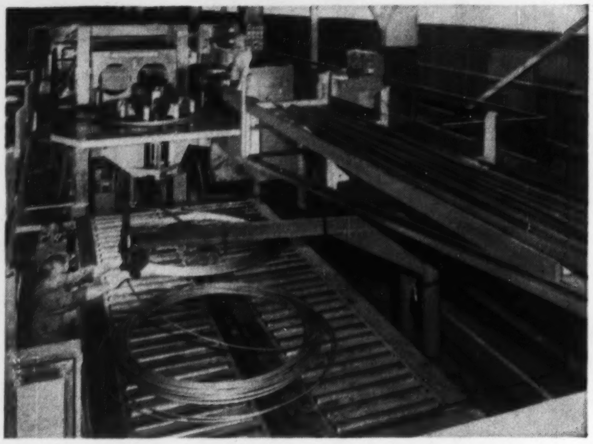
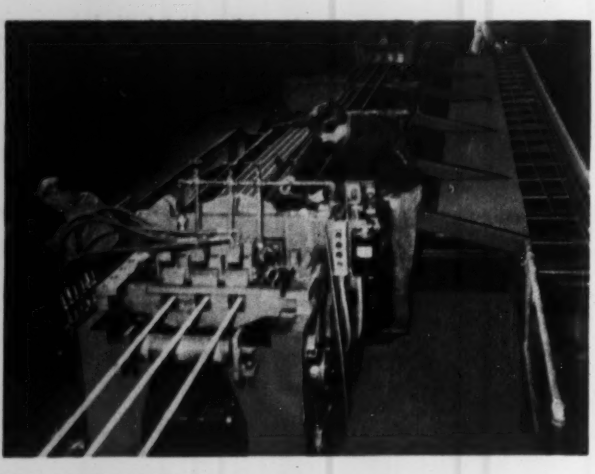
new ideas in
COLD
DRAW
equipment



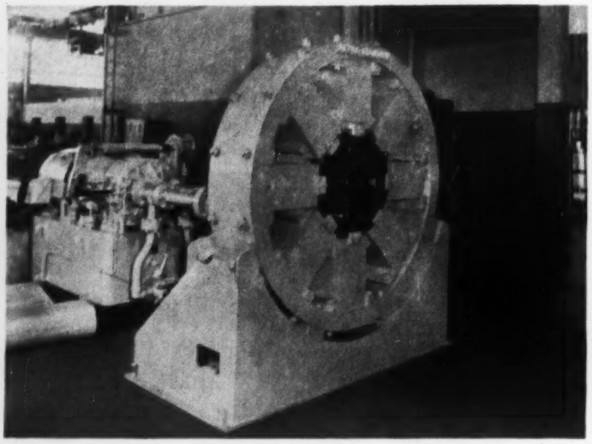
BULL BLOCK

Used for drawing long lengths of small diameter, thin wall copper tubing. Finished tube sizes—⅛″ O.D. to ¾″ O.D. Speeds up to 2000 f.p.m. Block diameters—10″ to 60″; Block lengths—24″ to 72″. Pulling capacities—1000 to 20,000 lbs. Inverted or Horizontal types.



BAR BENCH

Continuous flow material line from Bench to Shear to Straightener. Used for single, double or triple draw—rounds, squares, hexagons, flats, shapes in ferrous or non-ferrous (mild steel, stainless and alloys). Pulling capacity 25,000 to 100,000 lbs. Draw lengths 20 to 60 ft. lg. Choice of arms. Used with or without push pointers.



SQUEEZE POINTER

New hydraulic power unit. Simplified design, oil-tight, electric timers. Used for pointing copper, brass, and aluminum tubes, sizes 3″ O.D. to 13″ O.D. Automatic and manual control. Stroke adjustment for various point sizes. Production—Approximately 150 points per hour on 3″ O.D. Copper Tube pointed to 1½″ dia.

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CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

# Sound from Teeth to Hub

This is a mighty rugged spur gear, as indeed it would have to be. It is slated for use in a diesel locomotive, and here the description "heavy-duty service" fits like a glove.

The gear and others like it were fashioned from Bethlehem circular steel blanks, which are both forged and rolled. The forging-and-rolling operation is a unique single-step process that results in uniform density, highly desirable grain flow. The solid, homogeneous metal is easy to machine. To sum it all up, the blanks are *reliable*, all the way through. They make possible gears that are sound from teeth to hub.

Bethlehem forged - and - rolled blanks are produced in many sizes, the usual range being 10 to 42 in. OD. In addition to their uses in the making of gears, they are also recommended for sheaves, crane wheels, and other circular steel products. A wide choice of sections is available. Write for the full story.

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BETHLEHEM, PA.

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**BETHLEHEM STEEL**

BETHLEHEM STEEL

# AUTOMATION SIMPLIFIED

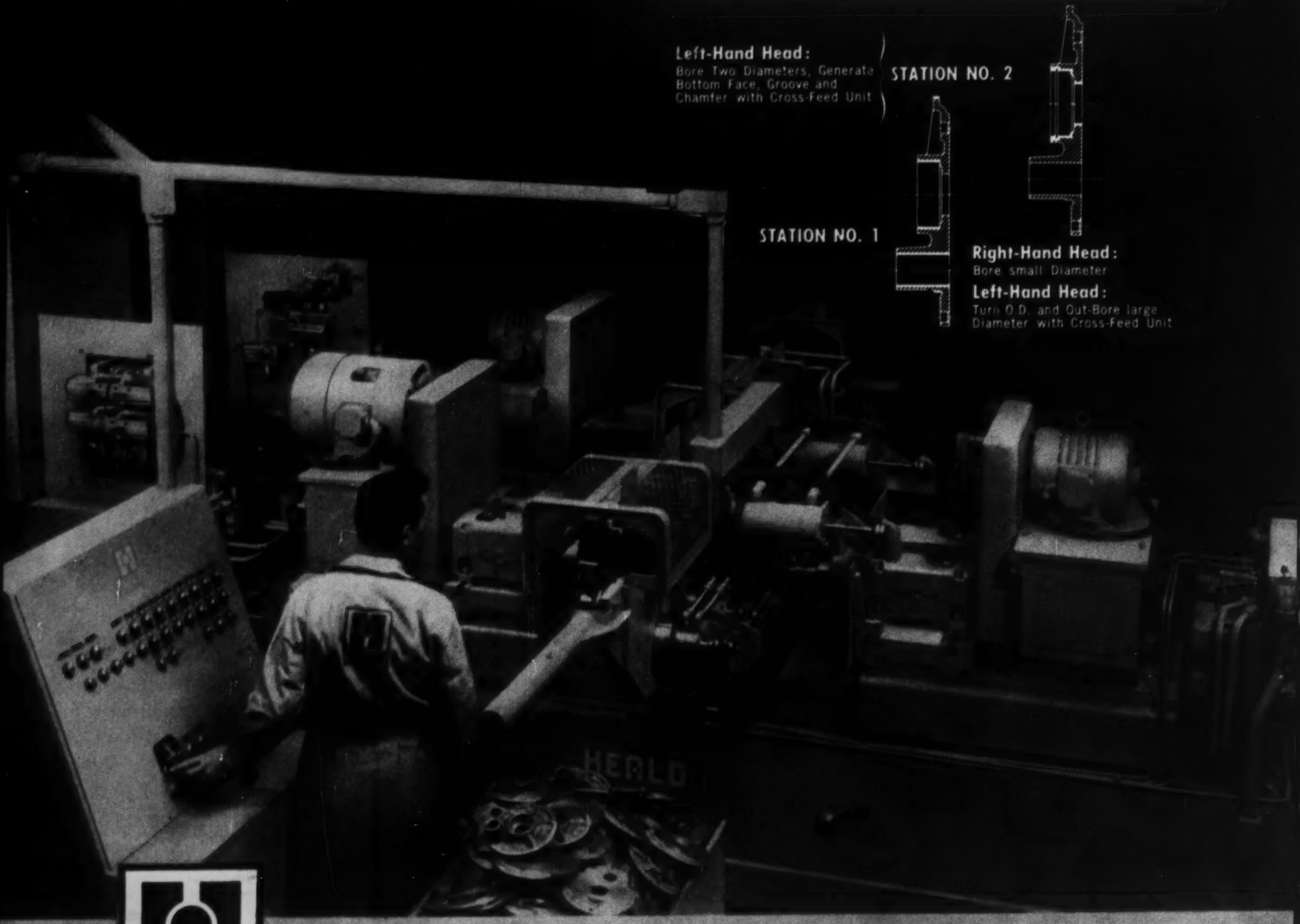
**Two-Station Automated Multi-Unit Bore-Matic precision finishes 8 different surfaces at 140 parts per hour**

The versatility of Heald Borizing, and the ability to perform several different operations simultaneously at a single station can contribute to the simplicity and economy of an automated production line.

The Multi-Unit Bore-Matic shown here, for example, can do in just two work stations what might otherwise have required more machines and a more extensive workhandling system. In this simple setup, cast iron pump covers are bored, turned, faced, grooved and chamfered at 140 parts per hour at 75% efficiency. Two parts are Borized simultaneously at each station and all operations except initial loading and final unloading are fully automatic.

For Automation that pays its own way...

**IT PAYS TO COME TO HEALD**


Left-Hand Head:
Bore Two Diameters, Generate Bottom Face, Groove and Chamfer with Cross-Feed Unit
STATION NO. 2
STATION NO. 1
Right-Hand Head:
Bore small Diameter
Left-Hand Head:
Turn O.D. and Out-Bore large Diameter with Cross-Feed Unit
HEALD

HEALD

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BRUSHING
AFTER
BRUSHING
(prior to plating)

*A leading manufacturer uses 16" diameter Osborn Fascut® Brushes, operating at 1700 rpm, to finish automotive trim parts prior to plating.*

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THE bright smoothness of metallic trim—adding a final touch of beauty to thousands of products—must start with an equally smooth surface prior to plating.

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An **O**sborn **B**rushing **A**nalysis, made in your plant and at no obligation, will point out the many ways Osborn power brushing can improve your metal finishing operations. Write *The Osborn Manufacturing Company, Dept. G-48, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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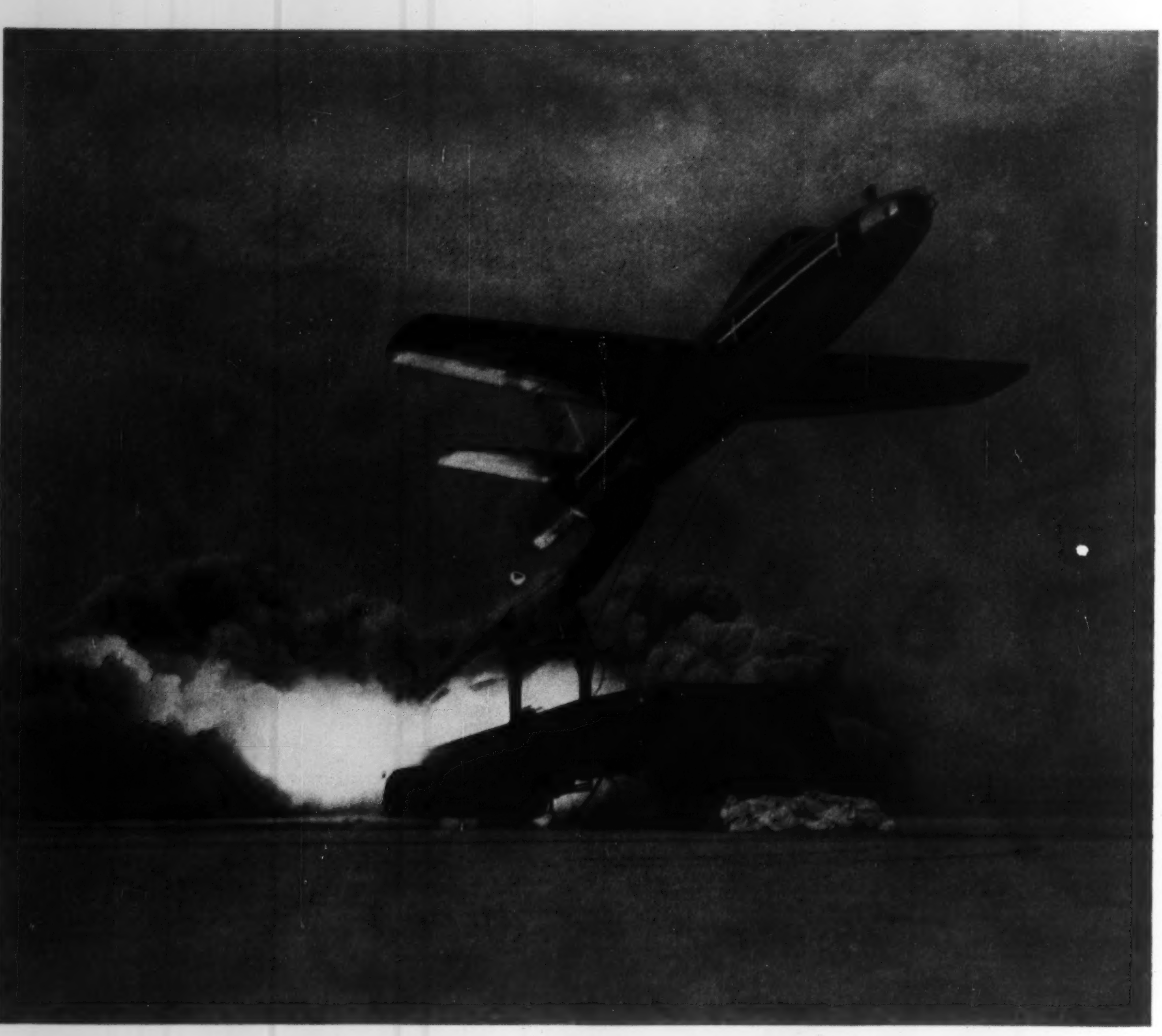
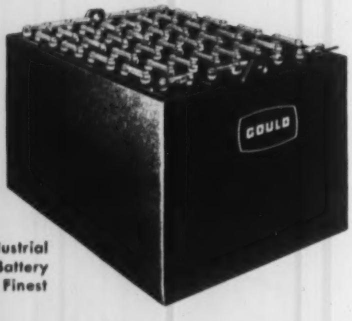
Osborn Brushes



*Get off to a good start . . .*

*specify* **gould**
**BATTERIES**



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The Metalworking Weekly

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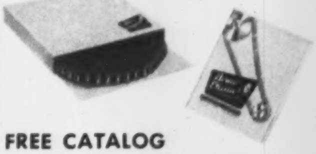

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# behind the scenes

## Construction Ahead

Indians of Nova Scotia, the Micmacs, have an expression describing a person who talks volubly about something he doesn't understand. When one of their number shouts at great length concerning, say, the economic organization of Thailand, another Micmac will usually grunt, "Jjhhiijj shskshsk," effectively bringing the talkative fellow down a peg or two. However, when a person talks sense, the aborigines of New Scotland express high approval by reversing their expression, and shouting, "Kshskshs jjiihhjj!"

Now, if there is anybody we know who rates a resounding "Kshskshs jjiihhjj!" it is STEEL's Assistant Editor John Botzum. John researched and prepared the thoughtful report on page 65 (the outlook for construction during the next ten years). There's a lot of information in this report, friends. For example, if you're a big sewer and water man, you can look for twice as much business in 1965. This year something over $1 billion was spent in sewer and water construction. In 1965 the figure will be close to $2.5 billion! Yes sir, get the shears and clip this construction report for reference—and let us know in 1965 how you make out.

## Faith in Unseen Report

Politics don't properly belong in the business press, except maybe at election time, but we just can't help thinking about former President Herbert Hoover with affection and admiration. Mr. Hoover headed a commission, you may remember, that aimed to eliminate waste and red tape from government operations. We haven't read the report, but we're almost certain he mentioned copyright stuff. As you know, STEEL is published every week—every Monday, to be exact, by the Penton Publishing Co. Its contents are copyrighted, of course; even this page, if you care to go into the fourth dimension of belief. Every week Circulation Manager Rand Ebersole is required to fill out two copies of a four page form entitled, "Application for registration of a claim of copyright in a periodical manufactured in the United States of America" and send them, together with a check for $4 and two copies of STEEL, to the copyright office in Washington.

Imagine how that office must bulge at the rafters along about this time of the year! How many magazines are published in the U.S., anyway? How much space is required to house them? What happens to them at the end of the year? Where does the money go? If STEEL pays $200 a year to copyright its contents, it might be cheaper to let appreciative publishers plagiarize the contents, and then sue them. It would save Rand a lot of typing, too. Well, we're going to find Mr. Hoover's report, and see what he suggests.

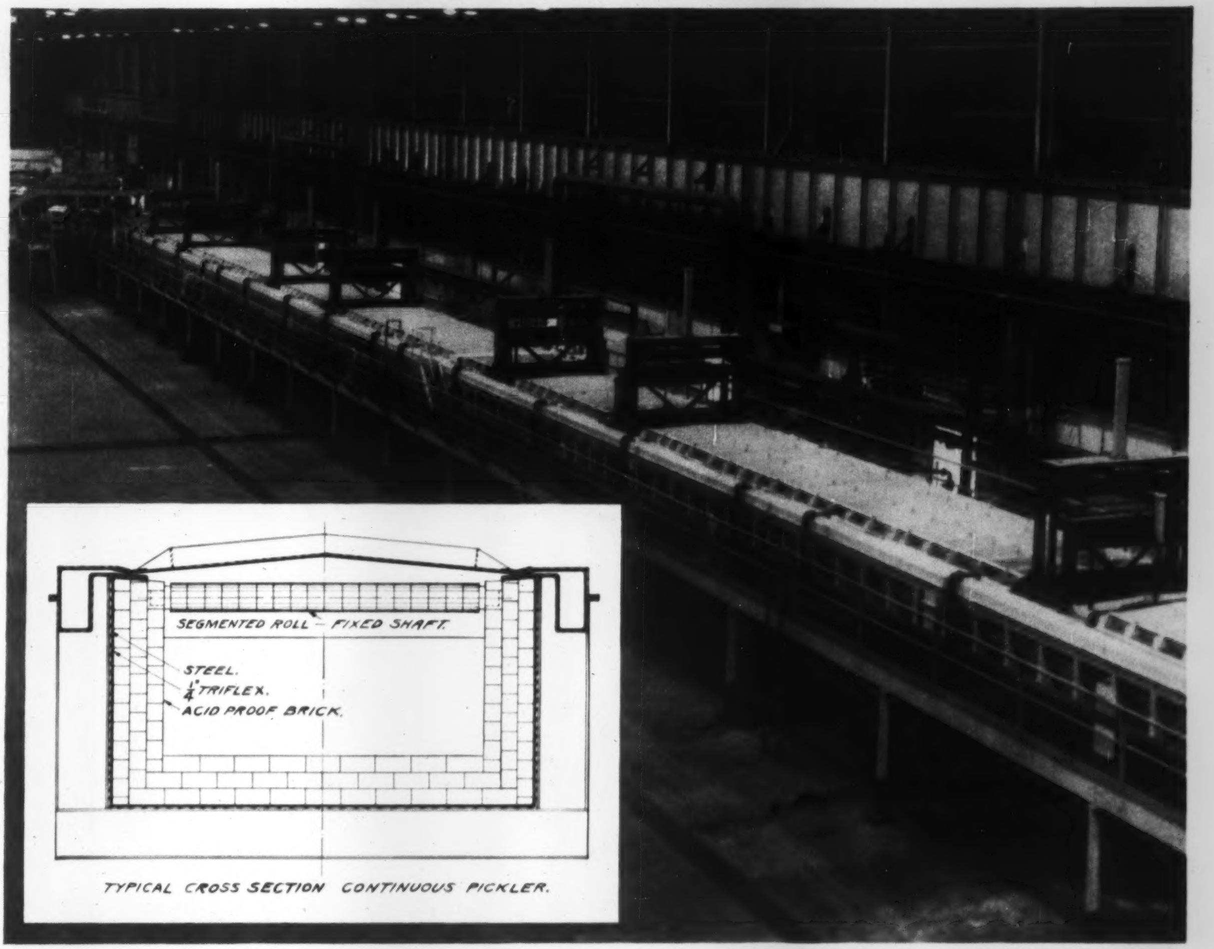
## Penurious Pedro

It pays to ask questions. We wondered what the capital R with an x on its tail meant, and before you could say "prescription" three times, G.S.C.C. of Granite City, Ill., writes that it means an abbreviation for a couple of Latin words meaning "Take thou." Hard on the heels of his note comes word from the Montana sage, Robert Wells, of Great Falls. He answers several old puzzles correctly, noting that Addison Simms's check was written in the amount of $51.24. He also sends in this one about Pablo Pedro Perez, the penurious Portugese peon. Pedro had a square piece of carpeting 9 yards on a side. He wanted to carpet his square room wall to wall, but he had no tape measure, so he used three measuring poles, 10, 30 and 40 ft long. Placing the two longer poles against one wall to form an X as low on the wall as possible, he found they crossed at an elevation of 10 ft. Now you must tell parsimonious Pedro how much he must trim from each dimension of his carpeting to make it fit his floor.

Shrdlu

(Metalworking Outlook—Page 59)

# B.F.Goodrich


SEGMENTED ROLL — FIXED SHAFT.
STEEL.
$\frac{1}{4}$" TRIFLEX.
ACID PROOF BRICK.
TYPICAL CROSS SECTION CONTINUOUS PICKLER.

Continuous pickling line engineered and built by Wean Engineering Co.

# Continuous pickling line at work 4 years, looks good for years more

THE high speed, efficient pickling line at U. S. Steel's Fairless Works is now in its fourth year of continuous service with only a minimum of maintenance. The reason: B. F. Goodrich Triflex rubber lining. The result: big savings through lowered pickling and maintenance costs.

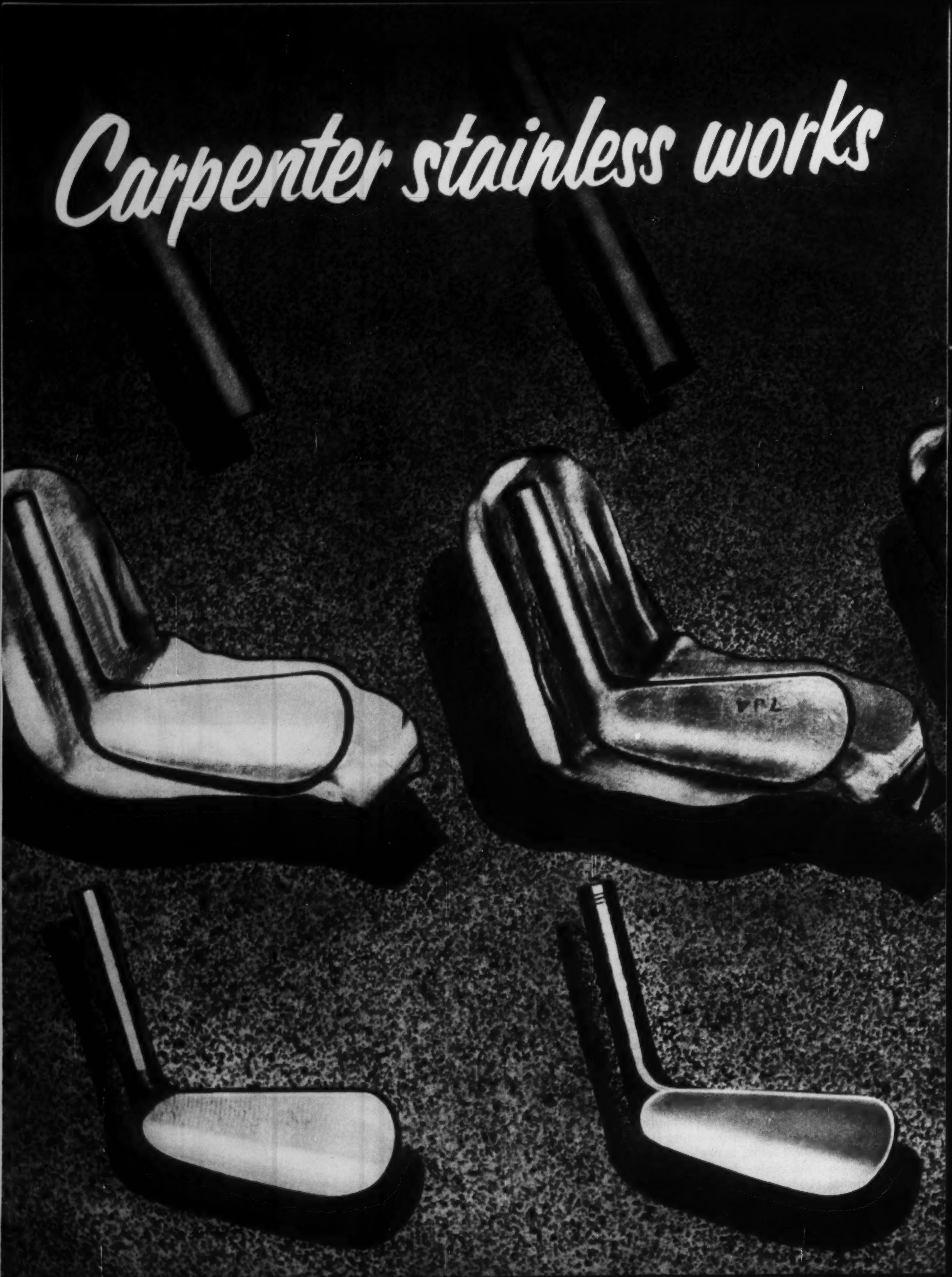
Twenty years ago such tanks were an innovation. Today, the steel, rubber and brick pickling tank is a standard specification. But the fact remains that just any tank of this type construction will not solve your pickling problems. It is B. F. Goodrich Triflex lining that ends leaks. This lining is not one layer of rubber, but three—hard rubber for acid resistance sandwiched between soft rubber for protection—with expansion joints which let the rubber expand and contract with the steel to which it is attached.

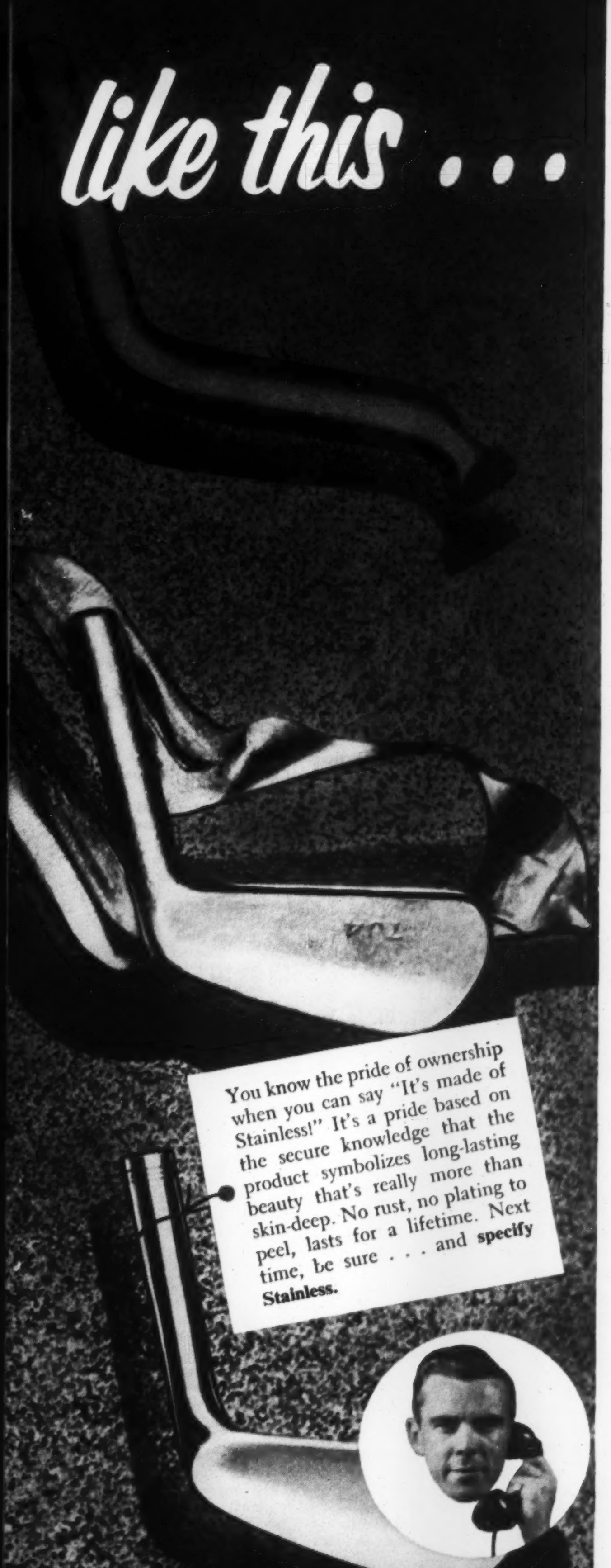
Remember, Triflex lining and expansion joints, the Vulcalock and Unilock processes for attaching rubber to steel, and brick sheathing are all B. F. Goodrich developments. Out of the hundreds installed during the past 25 years, not one has ever failed to end costly shutdowns for repairs and all other forms of pickling tank troubles.

Your specification of a B. F. Goodrich rubber-lined tank brings you, in addition to these proven construction features, the engineering experience of a group of men who are thoroughly grounded in modern pickling practice and capable of designing tanks to your individual needs. It is this record of past performance and experience which insures the economy and efficiency of every B. F. Goodrich installation. *B. F. Goodrich Industrial Products Co., Dept. M-777, Akron 18, Ohio.*

**B.F.Goodrich**

**INDUSTRIAL PRODUCTS**


Carpenter stainless works



You know the pride of ownership when you can say "It's made of Stainless!" It's a pride based on the secure knowledge that the product symbolizes long-lasting beauty that's really more than skin-deep. No rust, no plating to peel, lasts for a lifetime. Next time, be sure . . . and **specify Stainless.**

# because of *consistent* uniformity bar after bar

### when you want *RESULTS* . . .

in definitely improving fabrication of stainless steel, call Carpenter. For example, some time ago a large manufacturer of golf clubs asked Carpenter's help in changing to stainless for golf club heads. Some of the big problems involved were the many unfamiliar stainless fabricating operations (such as cold trimming, broaching, drilling, tapping, stamping, etc.). These operations made a uniformly *free-machinable* grade highly necessary. A Carpenter Free-Machining Stainless of "forging quality" proved its ability to take the severe forging operations involved, with no change in previous fabricating techniques. Through the years, this Carpenter grade has helped the company build product acceptance and user satisfaction.

### when you want *ACTION* . . .

on your free-machining stainless needs, dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. Immediate delivery from large local stocks is more than a claim . . . it's a *fact* . . . with Carpenter. Turn valuable plant space you've been using for in-plant steel inventory into profitable production space. Let your Carpenter Warehouse save you the cost and trouble of maintaining large stocks of specialty steels. Whether you want a few pounds or a few tons, Carpenter can get it to your plant faster. Dial the Carpenter location nearest you for service the way you want it.

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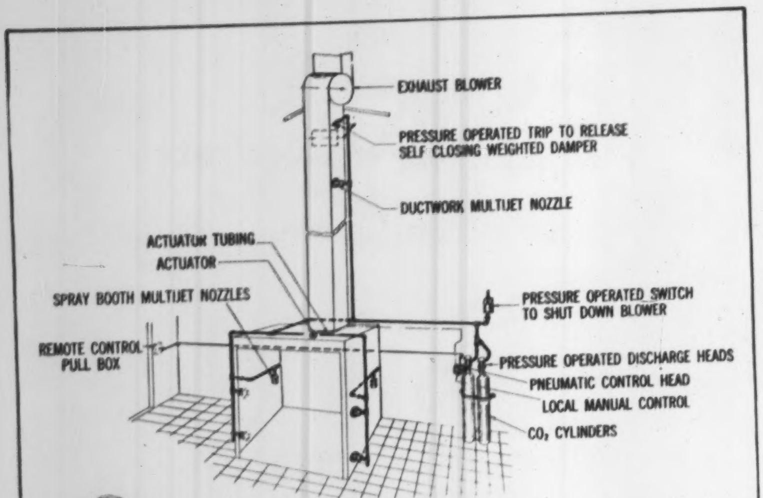
EXHAUST BLOWER
PRESSURE OPERATED TRIP TO RELEASE SELF CLOSING WEIGHTED DAMPER
DUCTWORK MULTIJET NOZZLE
ACTUATOR TUBING
ACTUATOR
SPRAY BOOTH MULTIJET NOZZLES
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AUTOMATIC
FIRE PROTECTION...
ENGINEERED
FOR SPRAY BOOTHS!

**SPRAY BOOTHS** can be tricky—safe one minute, ablaze the next. Because they are a special kind of fire hazard, spray booths demand a special kind of *fire protection*. Like a Kidde *Automatic* $CO_2$ Fire Extinguishing System.

By means of rate-of-temperature-rise detectors, a Kidde system spots—and smothers—even the most vicious blaze the instant it begins . . . pouring clouds of $CO_2$ over the flames through wide-dispersion Multijet nozzles.

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For more information on the best in fire extinguishing systems, and help in solving your specific fire problems, write Kidde today.

Kidde

Walter Kidde & Company, Inc.
1160 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

# LETTERS
## TO THE EDITORS

### Lauds Oct. 15 Issue

We always find STEEL informative and interesting. We believe, however, that the Oct. 15 issue is outstanding insofar as the number of worth-while articles found therein.

We would appreciate receiving copies of these articles: "Fabricates Giant Reactor Vessel" (page 135); "Steel Challenges the Young" (page 128); "Metalworking Tackles the Satellite" (page 120); and "Automation—Bogeyman or Bonanza?" (page 109).

L. J. Erckman
Senior Standards Engineer
Link Aviation Inc.
Binghamton, N. Y.

### Impressed by Article, Editorial

We were impressed by the article, "Steel Founders Eye Future" (page 64), as well as the splendid editorial comment on it, "Chart Your Growth" (page 59), in the Oct. 8 issue. We would appreciate two copies of both.

E. S. Ted Taylor
Pacific Steel Casting Co.
Berkeley, Calif.

### Article Is Well Done

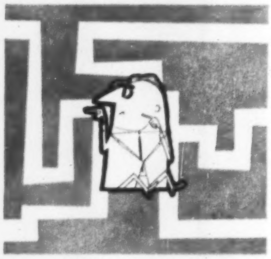
Your article, "Gain Quality, Trim Costs with Special Alloys" (Oct. 1, page 156), was well done.

We were particularly interested in the Metal Selector insert and would appreciate receiving a copy.

You mentioned that this is a supplement to the original Selector published in your Oct. 10, 1955, issue. We would be pleased to receive a reprint of this also.

T. J. Vernon
District Manager
Railway & Power Engineering Corp. Ltd.
Windsor, Ontario
Canada

### STEEL in Word Maze



I was interested in your article, "Wage Differential Maze: Where's Escape?" (Oct. 22, page 45), which I am sure unintentionally misrepresents some views on employee communication which were attributed to me.

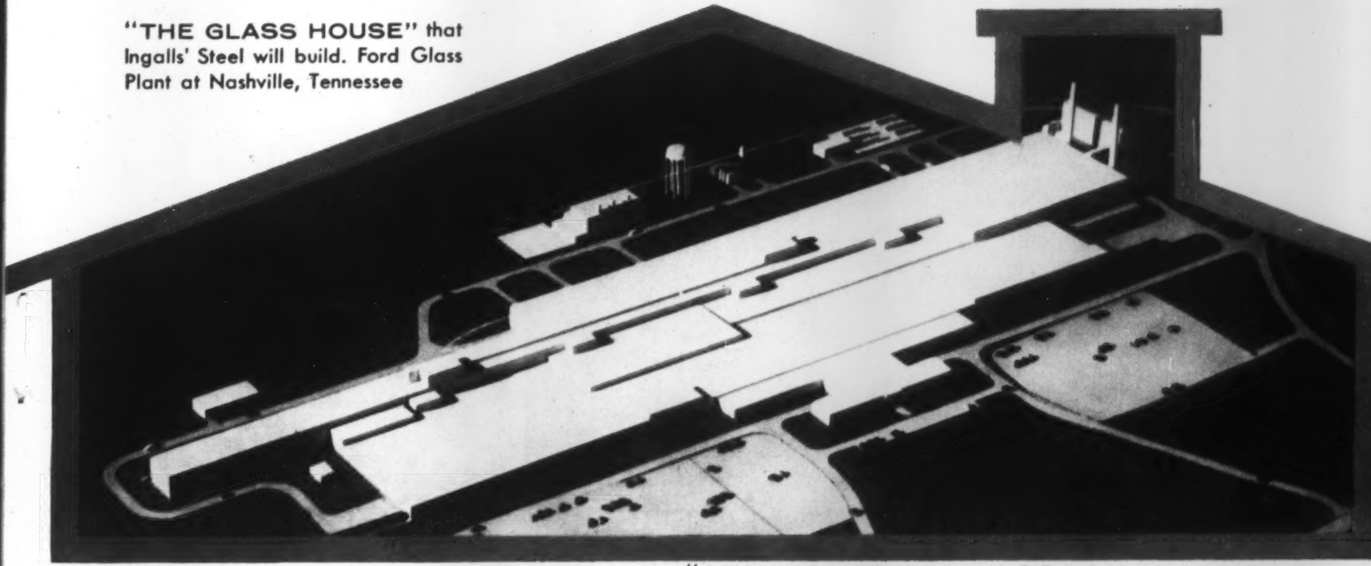
While it is true that we emphasize informing our employees of the facts pertaining to their jobs, we believe that good employee communication is the cart that follows the horse of good deeds in the employee relations area.

As I said in my recent speech in Cleveland—from which your reporter apparently got his impression of my ideas on this subject—we believe the

*(Please turn to page 12)*

# PEOPLE WHO WORK IN GLASS HOUSES

"THE GLASS HOUSE" that
Ingalls' Steel will build. Ford Glass
Plant at Nashville, Tennessee



"ARCHITECT'S MODEL" Giffels & Vallet, Inc., L. Rossetti

## . . . KNOW THAT LONG-TERM STRENGTH AND FLEXIBILITY MEAN INGALLS STEEL

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GLASS PLANT
under construction; 8800 tons of steel needed for 1,101,900 sq. ft. of plant area.

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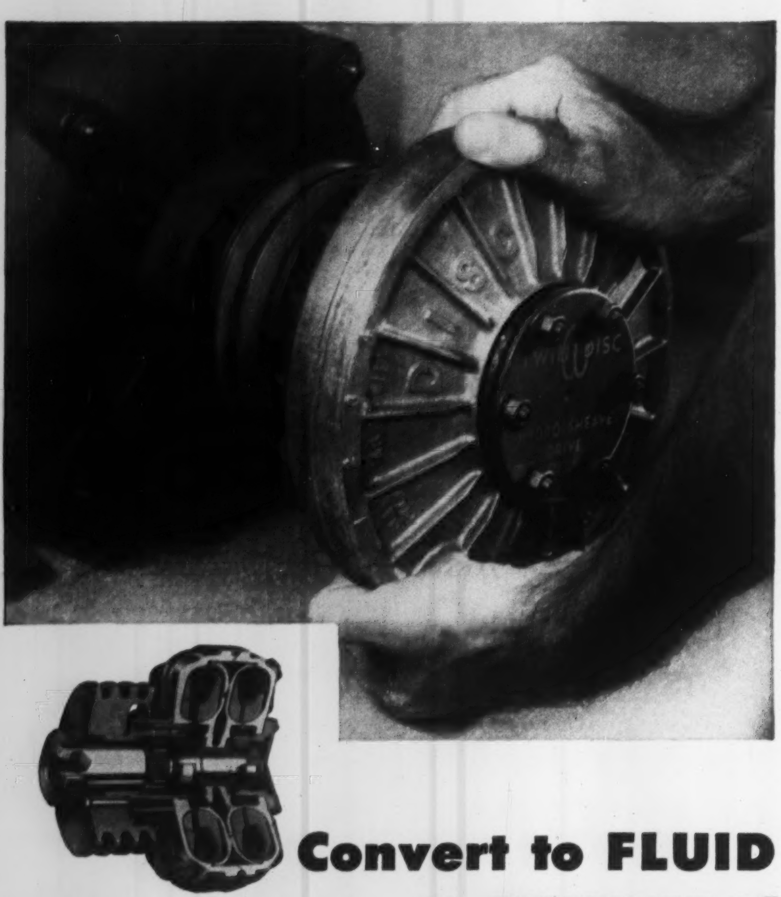

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TWIN DISC

TWIN DISC
Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

## LETTERS

*(Concluded from page 10)*

best mixture is "90 per cent demonstration—10 per cent communication."

Without good intentions continually being demonstrated by good practices, the best communication program in the world will not persuade employees that wage differentials, or any other employee relations policy or practice, is in the best interests of all concerned.

I appreciate the difficulty of achieving the proper emphasis in any abbreviated report, but I would not want your readers to get the impression that we put the cart before the horse.

Virgil B. Day
Manager-Union Relations
General Electric Co.
New York

### Associates To Get Copy

I would appreciate a half dozen copies of the article, "To Merge or Not To Merge" (Aug. 13, page 89). I found it to be such interesting reading that I would like to furnish my associates with a copy.

J. Y. Leveque
Consultant
Solar Aircraft Co.
San Diego, Calif.

Please send six copies.

M. B. Hammond
Vice President
Rockwell Spring & Axle Co.
Coraopolis, Pa.

### Basis for Cost Analysis

I would appreciate a copy of the article, "Check Small Accounts' Cost" (Oct. 15, page 80). It is of great value to me in establishing a basis for sales cost analysis.

John A. Casey
Market Analyst
Bearing Division
McGill Mfg. Co. Inc.
Valparaiso, Ind.

### Appreciates Foresight of Staff

Please send a copy of the article, "Molybdenum: Open for Business" (Oct. 22, page 80).

We are grateful to your efficient staff for having the foresight to compile the necessary data for these technical and up-to-date articles.

L. F. Megow
General Manager
Fabricated Steel Products Division
Hahn & Clay Machine & Boiler Works
Houston

### Title of Nickel Report

We have read the article, "Next Five Years in Nickel," in the Sept. 3 issue (page 50) and found it interesting.

We would like to know the title of the interim nickel report upon which it was based. The report was submitted to Congress by the Commerce department and the Office of Defense Mobilization. Is a copy available from the U. S. Government Printing Office?

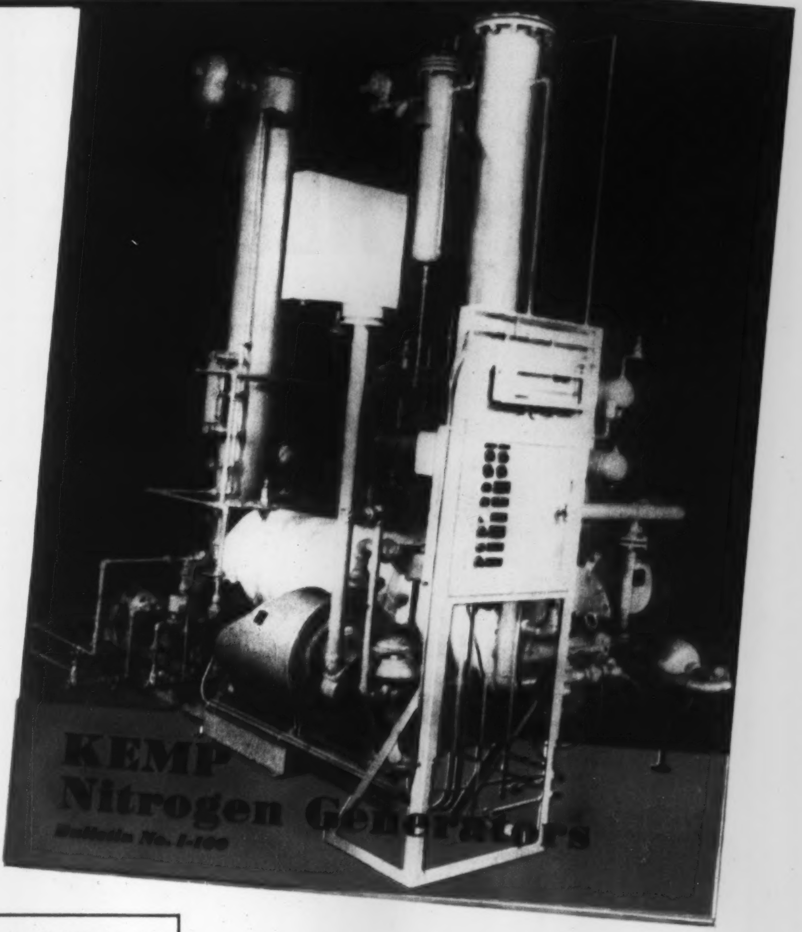
K. Kanno
Chief
Marketing Research Section
Japan Steel & Tube Corp.
Tokyo, Japan

• *The report (dated Aug. 15, 1956) is titled: Interim Report on Nickel to the Senate and the House of Representatives of the United States. It is not available for distribution.*

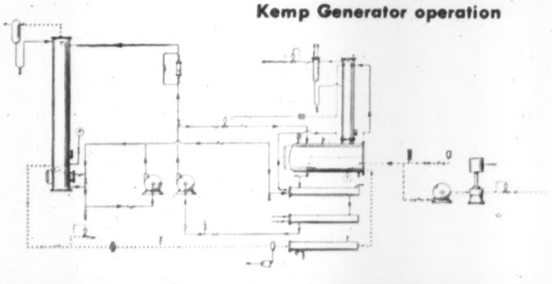
ATTENTION ENGINEERS!

**If you use Nitrogen as a Protective Atmosphere in Heat Treating . . .**

**this *NEW* Bulletin shows how KEMP $N_2$ Generators slash operating costs, increase quality!**



**Flow diagram explains simple Kemp Generator operation**



Send today for your free Kemp Nitrogen Generator Bulletin No. I-100. It's packed with valuable information on how you can improve your inert gas operation by switching to Kemp Generators.

Bulletin contains complete operation procedure, design features, composition chart, data chart and a detailed flow diagram. In addition, you receive an inquiry data sheet that you may fill in and send to Kemp, at no cost to you, for a free evaluation.

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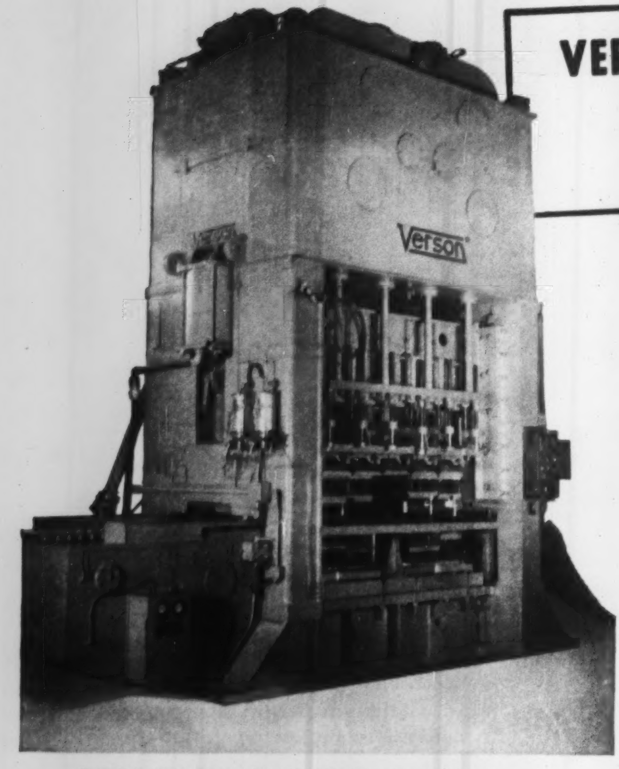
*There is only one primary reason for buying a Transmat press . . .*

# LOWER UNIT COSTS WHERE PRODUCTION

## VERSON TRANSMAT PRESSES

**are engineered and built to give you this economy**



**TYPICAL 500 TON VERSON TRANSMAT**—This is the press that produces the valve covers described at the right. Today's Verson Transmat is the culmination of twenty years of specific development of an automatic process to produce multiple operation stampings. Since the installation of the first Transmat eighteen years ago,* the machine has progressed to the point where there is no limit to tonnage capacity or size of piecepart that can be produced. Transmats as small as 100 tons and as large as 4000 tons have been built.

*Still in service, producing 1300 oil filter shells per hour.

If you produce any part requiring four or more operations on 4000 or more pieces per day, Verson Transmat Presses offer remarkable opportunities for cost reduction.

The Verson Transmat is designed and built solely for the purpose of producing multi-operation stampings at the lowest possible cost. Design is not compromised in any way that will affect this objective! As a result Verson Transmats offer a combination of advantages available in no other transfer press—

- High speed—20, 25 and even 36 strokes per minute with machines having capacities up to 4000 tons.
- Positive, direct, gear driven transfer mechanism with safety interlocks make misfeeding impossible.
- Non-oscillating feed bars; only the fingers move in and out—fast, smooth action.
- Automatic, delayed action, adjustable stroke knockout cylinders at each station—prevents damage to piecepart by positive stripping and location.
- Individual adjustable wedge slides for precise die adjustment.
- Fully automatic lubrication—two Cascade oil flow systems and two pressure systems.

When you buy a transfer press be sure you get the high production you are paying for. Be sure you get the efficient, trouble-free operation that Verson know-how assures you. Described at the right are a few of the jobs being performed successfully at this moment. We'll be happy to tell you about others . . . and we'll welcome the opportunity to show you what Transmats can do for you. Write or phone.

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

Verson

**VERSON ALLSTEEL**

9318 S. Kenwood Avenue, Chicago 19, Illinois

MECHANICAL AND HYDRAULIC PRESSES • TOOLING • TRANSMAT

# ON JOBS REQUIREMENTS ARE HIGH

*Here's Proof*

## of what VERSON TRANSMATS can do

**These are verified production figures of a few of the Transmats in use in metalworking plants at this moment.**

20⅜" x 3⅝" x 2¾"—18 ga. stock.

### 1,200 VALVE COVERS PER HOUR

Five operations on each, a total of 6,000 press operations per hour. The part is formed from strip. Two such presses are currently in operation, both since 1954.

5" diam. x 2¼"—16 ga. stock.

### 1,500 MOTOR HOUSINGS PER HOUR

Ten operations on each, a total of 15,000 press operations per hour. The part is formed from strip. One 600 ton Transmat has been in operation for over one year.

7" diam. x 4"—20 ga. stock.

### 900 HEADLAMP HOUSINGS PER HOUR

Six operations on each, a total of 5,400 press operations per hour. The part is formed from pre-blanked stock. Five 250 ton Transmats of this type are in service, the earliest since 1949.

19½" x 3¾" x 5½"—.1606" stock.

### 1000 AXLE HOUSINGS PER HOUR

Seven operations on each, a total of 7,000 press operations per hour. The part is formed from previously developed blanks. Two such 2,200 ton Transmats have been in service for about one year.

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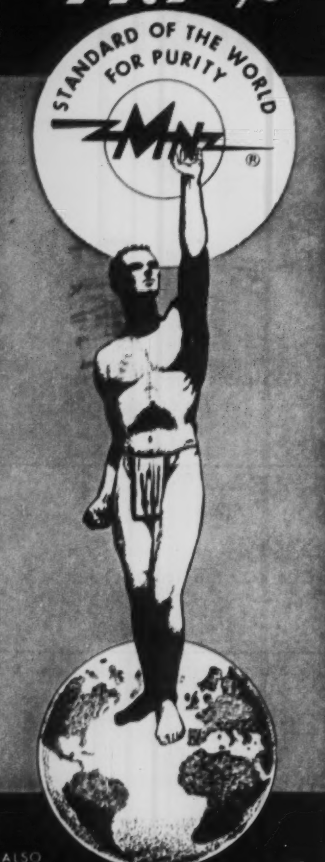
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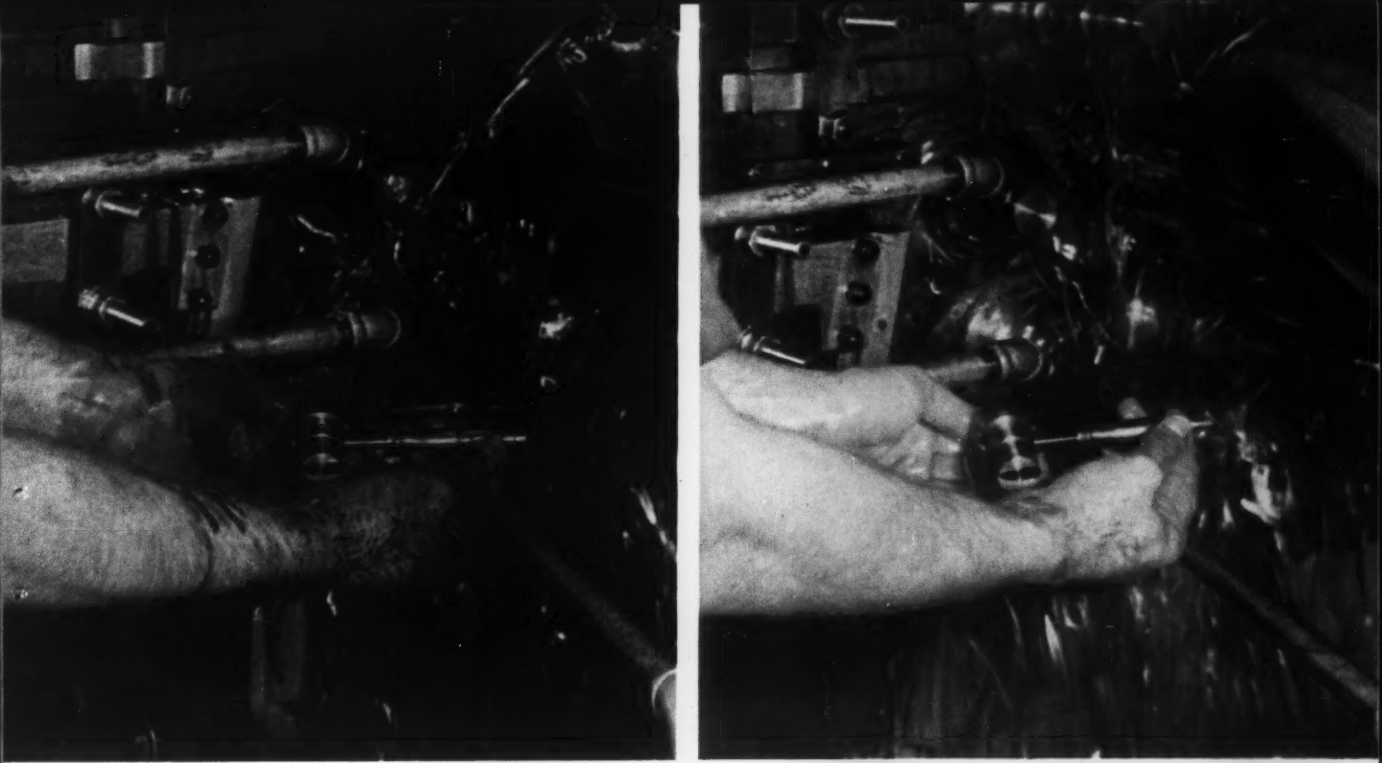

**Black cutting oil** (left) makes close control difficult. Operators dislike dirty operating conditions it creates. Close control is easier and workers are happier with transparent Sunicut cutting oil (right).

# WHY USE A BLACK CUTTING OIL WHEN YOU DON'T NEED IT?

**Sunicut oils give you better visibility without sacrificing machining efficiency.**

When trying to maintain close control over machines producing precision parts, operators can be handicapped by "black-oil blindness". It is hard to see the tools, the workpiece, and the finishes. Checking close tolerances is difficult when the graduations on micrometers and gauges are obscured.

Worse still, as the operator sees it, are the dirty working conditions caused by dark oils. His clothes get saturated with hard-to-remove stains, and his hands are black from one end of the shift to the other.

Transparent Sunicut oils help keep your operators happy and will make close control easier ...and transparent Sunicut oils will do the job with no sacrifice in machining speed or finishes.

To get the full story on Sunicut oils, see your local Sun representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-41.

SUNOCO ®

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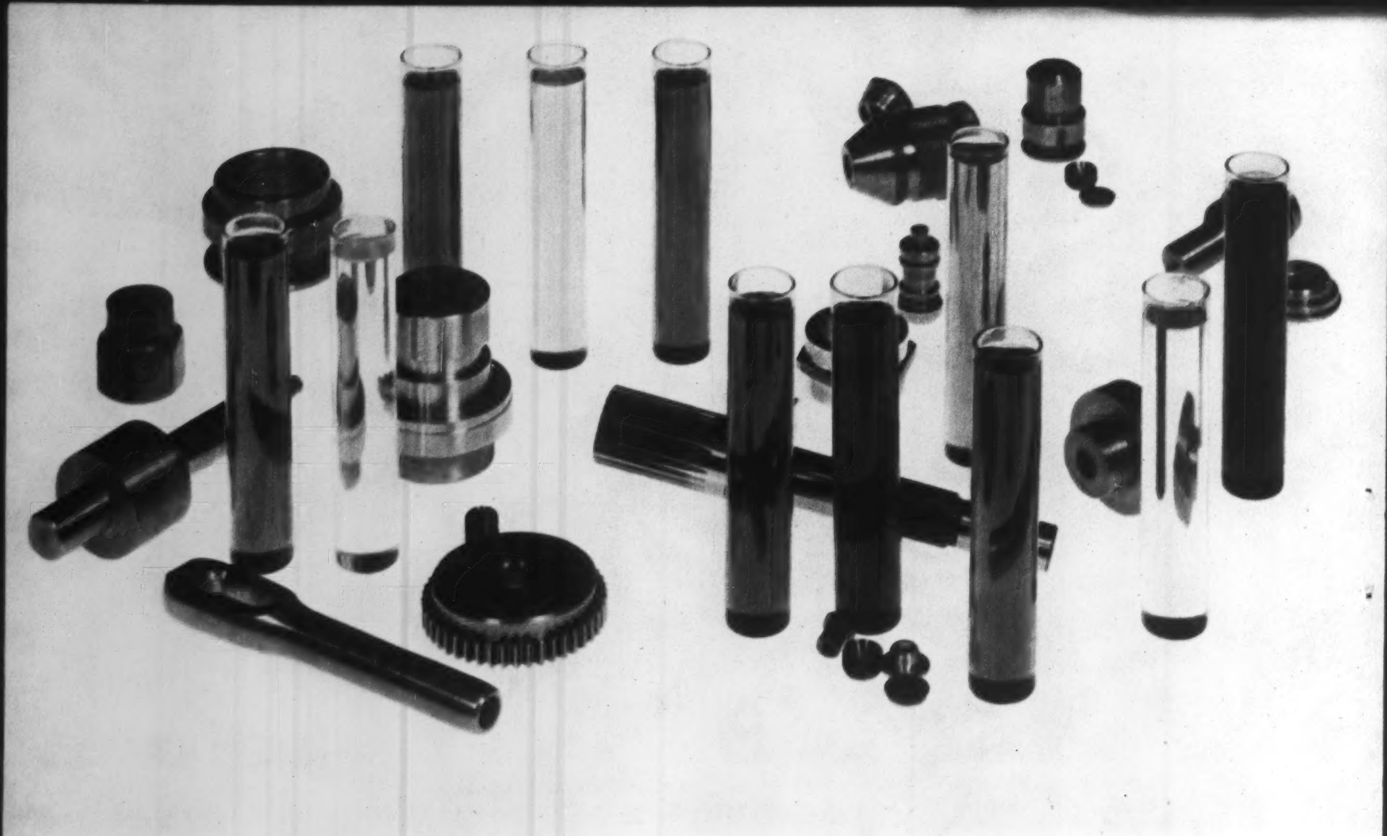

*For any machining or grinding operation . . .*

## THERE'S A SUN OIL THAT'LL GIVE YOU HIGH EFFICIENCY AND LOW OVER-ALL COST

No two machine shops have exactly the same problems when it comes to selecting cutting oils . . . even when they're running the same job. And, until somebody comes up with the truly universal cutting oil, you can't afford to disregard the importance of oil selection. Here's how Sun can help you.

First, Sun makes a complete line of emulsifying and straight cutting and grinding oils. Second, your Sun representative, backed up by field engineers, has the necessary practical experience to recommend the oil that will give you both high machining efficiency and low over-all costs.

For the full story about Sun's cutting oils, see your Sun representative . . . or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-42.

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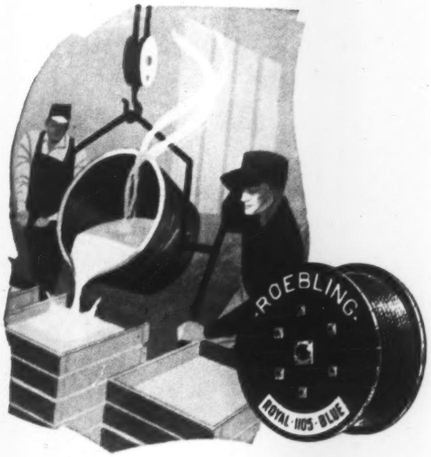
IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL *faster*

# Royal Blue has won acceptance *faster* than any other wire rope in Roebling history



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**PRODUCTS COUNT!** . . . and only Ferry Cap can supply you with three lines of hexagon head cap screws:

**LO-CARBS** for regular use
**HI-CARBS** for strength
**SHINYHEADS** for looks

PLUS: Set Screws—square head and headless, Fillister Cap Screws, Flat Head Cap Screws, Shinyland Studs, and Hexagon Nuts.

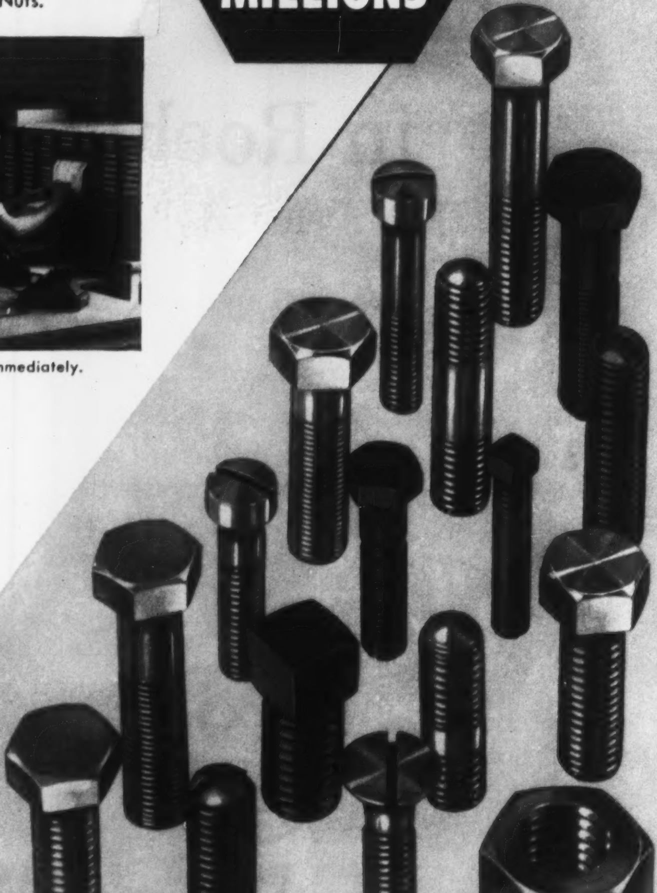
**STANDARDS by the MILLIONS**

New, highly efficient Order Department processes your order immediately.

### *SERVICE COUNTS!*

### New Order Department . . . *geared to* FASTER SERVICE!

A streamlined, new system operated by experienced personnel speeds your order through to our shipping department the very day it arrives! Both mail and phone orders are received and recorded at these busy desks . . . and are sped away to the shipping department. By the running inventory maintained here, Ferry Cap management is constantly aware of all inventory situations, and the factory is automatically alerted to start producing any item before shortages can develop. That's why **standards** are "in stock" when you order. **Ferry Cap is geared to FAST SERVICE!**



# Anniversary

**YESTERDAY**—Our first shipment was a 25-pound keg delivered locally by horse and wagon.

THE FERRY CAP & SET SCREW CO.

**TODAY**—Ferry Cap products are used nationwide and reach our customers swiftly by truck, train, and plane.

## SPECIALS by the MILLIONS

**Not only** does Ferry Cap make standard fasteners, but we are "specialists at special fasteners" . . . and we can supply them to your blue prints on short notice.

**Odd shapes** pose no problem, for we have long experience in providing the unusual. And your special can be furnished in many types of carbon, alloy, or stainless steel—and in non-ferrous materials as well.

**With many types** of production equipment for secondary machining, drilling, milling, grinding, and heat treating, we are equipped to give you special features and any plated finish. You'll find that Ferry Cap's thorough inspection system insures conformity to your specifications.

**COUNTR—BOR®**
A new screw for counterbored
or other socket head
screw applications.

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Pioneers and Specialists, Cold Upset
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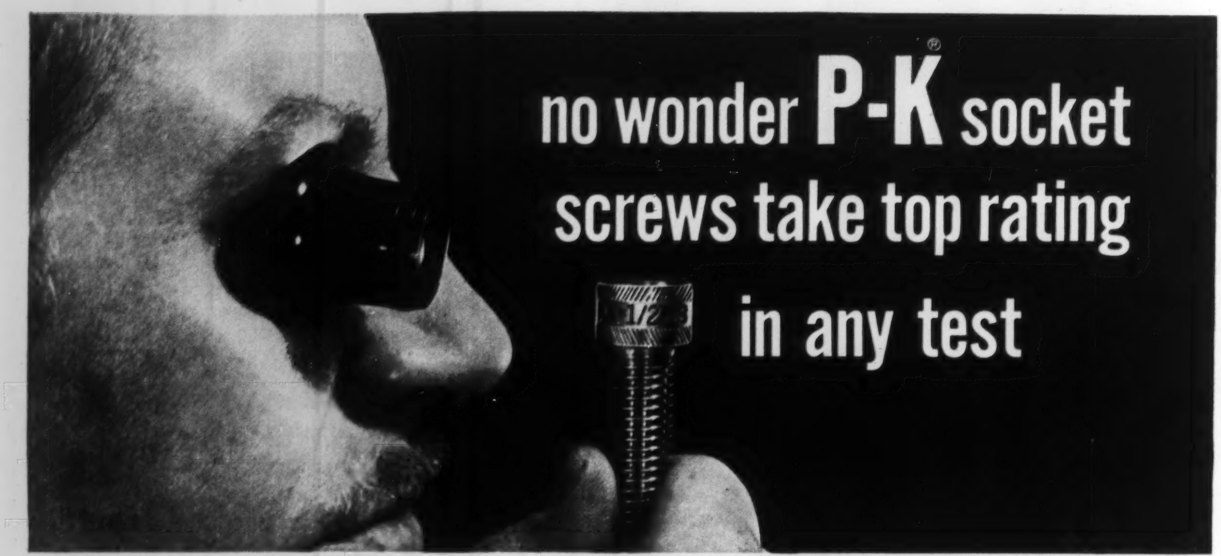


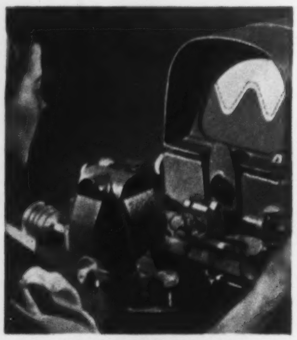
# no wonder P-K® socket screws take top rating in any test

**ROCKWELL HARDNESS TEST.** With this familiar laboratory device, the hardness of screws is carefully tested as a check on heat-treatment.

**PERFORMANCE.** Both the raw material and finished screws are tested on this equipment to determine ductility and strength under tension loads.

**HEX DIMENSIONS.** To make sure that the hex meets exacting specifications, a team of inspectors check dimensions across flats at the machine.

**HEAD DIAMETERS.** As heads are shaved on automatic machines, such as those shown here, constant checking by operator and inspector maintains accuracy.



**THREAD CONTOUR AND LEAD.** The Comparator permits checking of thread contour and lead of screw heads against Class 3A Tolerances.

## SEE FOR YOURSELF

These are just a few of the steps in the rigorous test and inspection routine conducted in Parker-Kalon's modern fastener plant. Exacting quality control assures that all "doubtful screws" are eliminated—that every P-K Socket Screw delivered to you is first quality. Parker-Kalon guarantees that it's first quality. In strength, dimensional accuracy and overall uniformity, you can be sure . . . "if it's P-K, it's O.K."

**PARKER-KALON DIVISION,** General American Transportation Corporation
Manufacturers of Self-tapping Screws, Socket Screws, Screwnails, Masonry Nails, Wing Nuts and Thumb Screws

**PARKER-KALON® fasteners**

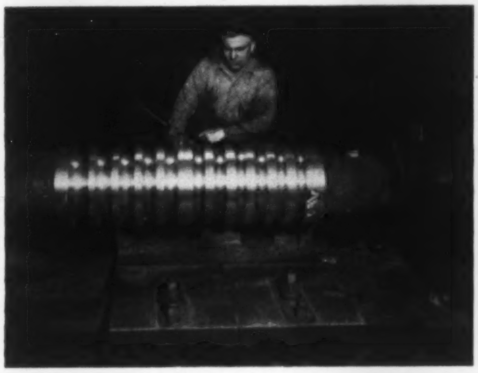
Sold Everywhere Through Leading Industrial Distributors
Factory: Clifton, New Jersey  Warehouses: Chicago, Illinois—Los Angeles, California

# TIPS FROM A ROLL MAKER'S NOTEBOOK

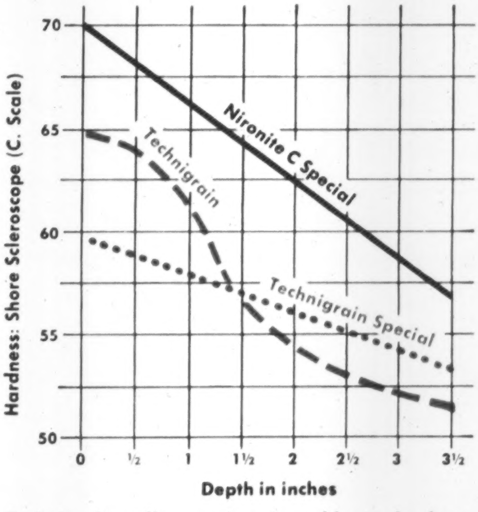
**MACKINTOSH-HEMPHILL DIVISION,** E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

## A merchant mill roll should be just good enough



**Easy to turn:** Mack-Hemp *Technigrain* and *Technigrain Special* rolls are readily turned and redressed.



**Technigrain rolls** compare favorably in hardness penetration with more expensive, higher-alloy types, as shown by these generalized curves.

The wise purchaser of merchant mill rolls buys rolls that give him the service life he needs *and no more*.

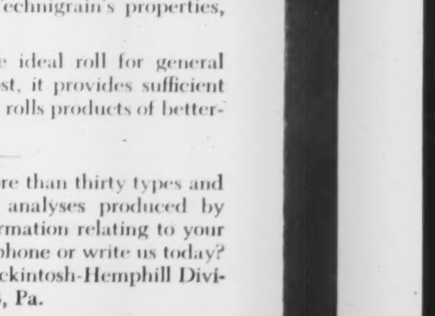
This is because increased roll service life usually goes hand in hand with higher alloy content and more complex heat treatment. Both add to the price of the rolls. But... most merchant mill operators redress their rolls after each production run. Thus, if a set of rolls is still good for more tonnage before redressing at the end of a run, chances are that the rolls are too good—and therefore too expensive—for the job.

**But price is not the only consideration.** To be just "right", a merchant mill roll should (1) offer wearing qualities closely related to the length of the production runs for which it is used; (2) have good hardness penetration to provide wear resistance at the bottom of passes; and (3) have grain structure fine enough to assure good finish of the rolled product.

**Quality at low price.** Mack-Hemp *Technigrain* and *Technigrain* Special rolls offer an inexpensive solution. In fact, *Technigrain* rolls are so generally useful for all merchant shapes that they have virtually eliminated the roll inventory problem for many operators. At a price that averages several cents per pound less than higher-alloy grain rolls, *Technigrain* and *Technigrain Special* provide service life adequate for the vast majority of applications. Available in a hardness range of 55 to 60 Shore (C Scale), they offer good hardness penetration and finely dispersed graphite to provide a smooth work surface. Of course, for unusually severe merchant mill service, Mack-Hemp's *Nironite C Special* offers all of Technigrain's properties, in a higher hardness range.

To sum up, *Technigrain* is the ideal roll for general merchant mill use: it is low in cost, it provides sufficient service between redressings, and it rolls products of better-than-adequate surface finish.

**Technigrain** is only one of the more than thirty types and hundreds of iron and steel roll analyses produced by Mack-Hemp. For advice and information relating to your specific roll application, why not 'phone or write us today? There's no obligation. Address Mackintosh-Hemphill Division, E. W. Bliss Co., Pittsburgh 3, Pa.

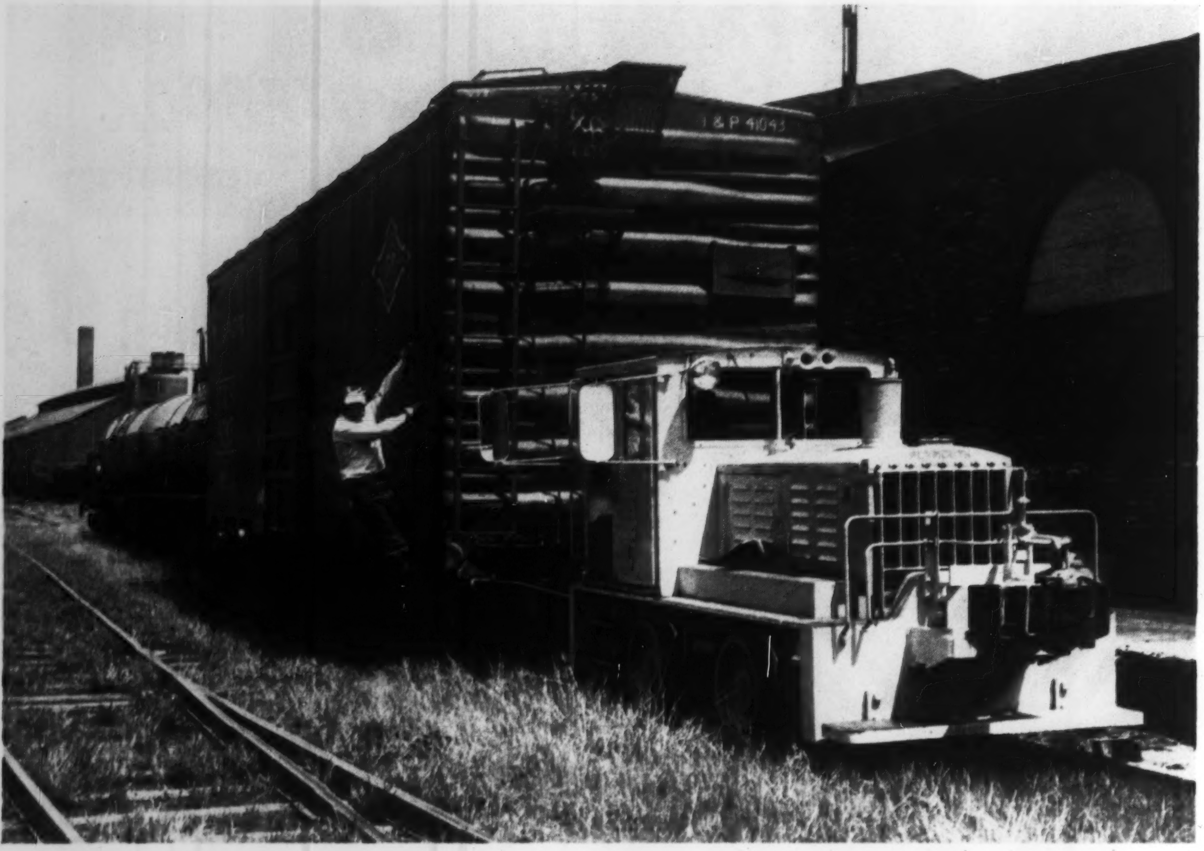


**MACKINTOSH-HEMPHILL**

*You get more tonnage from the rolls with the Striped Red Wabblers*

**Division of E. W. BLISS COMPANY**

**Presses, Rolling Mills, Special Machinery**



Small but mighty, this Model DGT Plymouth Torqomotive is shifting and spotting mammoth loads swiftly and lowering costs at the Pennsylvania Salt Manufacturing Company's Natrona, Pa., plant.

# This is the Little Engine That Could ...and Does! It's a PLYMOUTH!

Stepping into a job formerly handled by two 45 ton steam locomotives, this 12 ton gasoline powered Plymouth proved more than equal to the task. Cars grossing 95 tons were shifted around the yards and the acid test was passed when ore cars loaded with cryolite were pushed up a 1½% grade around curved track to the unloading trestle.

Along with this amazing performance came instant availability, higher efficiency, and overall cost savings. The smooth, steady application of power through the Torqomotive Drive makes up for many tons of dead weight no longer needed for tractive effort. Yet even the smallest Plymouths feature the rugged, heavy-duty Plymouth construction that insures years of trouble-free service under the toughest conditions.

Plymouth models from 3 to 80 tons are available today. Which one best fits your haulage needs can be easily determined if you send us a brief outline of your operation. We will submit prompt recommendation. Address: Plymouth Locomotive Works, The Fate-Root-Heath Company, Dept. A-1, Plymouth, Ohio.

***"Our Plymouth Torqomotive is cutting costs for us.***

*It has speeded up our shifting time . . . our operators have only compliments to offer for its performance!"*

**says Malcolm A. Cross,**
**Plant Engineer**

**THE PENNSYLVANIA SALT**
**MANUFACTURING COMPANY**
**Natrona, Pa.**

**PLYMOUTH® LOCOMOTIVES**

WITH TORQOMOTIVE DRIVE

RAIL POWER

PLYMOUTH LOCOMOTIVES—
in PROGRESSIVE INDUSTRY
throughout the WORLD

ALSO BUILDERS OF
F·R·H CERAMIC MACHINERY

# CALENDAR
## OF MEETINGS

**Nov. 7-9, Steel Founders' Society of America:** Annual technical and operation conference, Carter hotel, Cleveland. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

**Nov. 8-9, Society of Automotive Engineers Inc.:** National fuels and lubricants meeting, Mayo hotel, Tulsa, Okla. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

**Nov. 12-16, National Electrical Manufacturers Association:** Annual meeting, Traymore hotel, Atlantic City, N. J. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

**Nov. 14-15, Building Research Institute:** Research correlation conference on windows and glass in exterior of buildings, U.S. Chamber of Commerce, Washington. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: William H. Scheick.

**Nov. 25-30, American Society of Mechanical Engineers:** Annual meeting, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

**Nov. 26-27, Wire Reinforcement Institute Inc.:** Fall meeting, Jung hotel, New Orleans. Institute's address: National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

**Nov. 26-30, American Society of Mechanical Engineers:** 22nd National Exposition of Power & Mechanical Engineering, Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. Exposition manager: E. K. Stevens.

**Nov. 26-30, National Institute of Management Inc.:** Production control and inventory management program, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

**Nov. 27-30, National Chemical Exposition, Public Auditorium, Cleveland. Information:** American Chemical Society, Chicago Section, 86 E. Randolph St., Chicago 1, Ill.

**Nov. 28-30, National Industrial Conference Board Inc.:** Atomic energy conference, Waldorf-Astoria, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

**Dec. 3-6, National Institute of Management Inc.:** Program on work simplification for supervisors, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

**Dec. 5-7, National Association of Manufacturers:** Annual meeting and exhibit, Waldorf-Astoria, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Secretary: Thomas M. Brennan.

**Dec. 5-7, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.:** Electric furnace steel conference, Morrison hotel, Chicago. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: Ernest Kirkendall.

ROUND–SOLID–TOUGH

**TRU-STEEL**

consistently-from one lot to the next-has everything you expect and pay for in premium shot

When you pay for premium material you expect premium performance—consistently. In TRU-STEEL **you get it**—consistently. Precision control of manufacturing processes, unsurpassed plant facilities, and the know-how of specialists whose only business is the manufacture of steel shot,—**assure it.** Tru-Steel is consistently round and solid, without hollow or stringy shot that reduce life cycle. Tru-Steel has the consistent hardness and chemistry from lot to lot that eliminates monthly variation in blasting costs. And,—it's superlatively graded; no other can match its uniformity.

Tru-Steel sells and stays sold on the basis of test and comparison with any other. Write us.

SSP
TRU-STEEL SHOT
STEEL SHOT PRODUCERS, INC.
BUTLER, PA. - U.S.A.

NOW IN 50-POUND BAGS

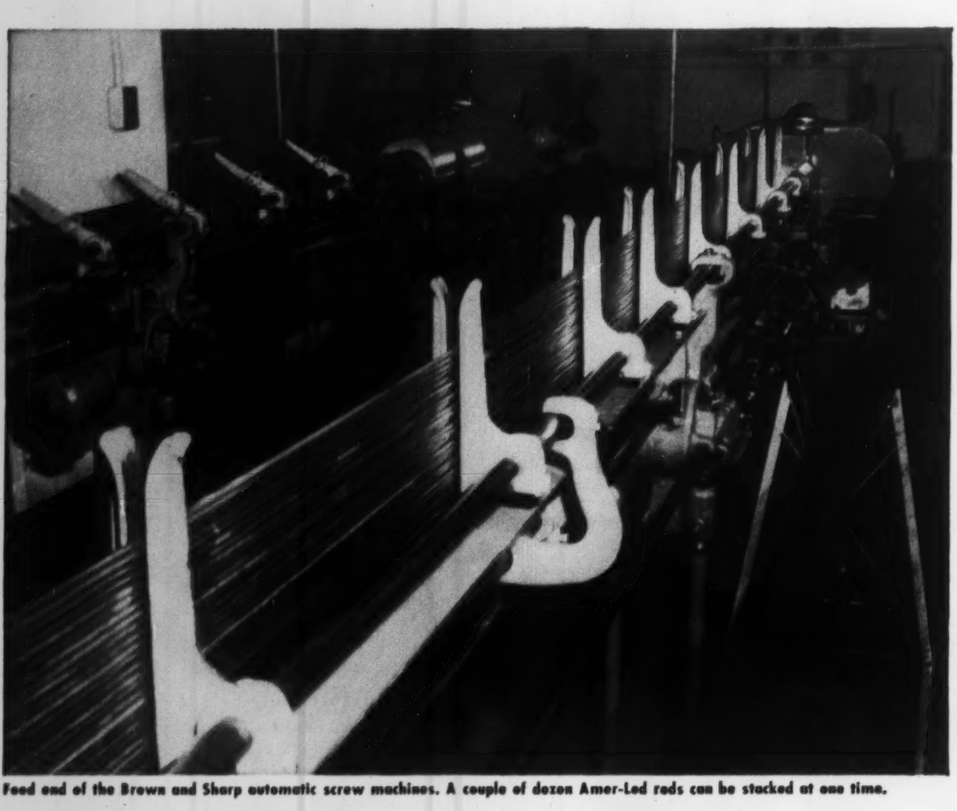
**TRU-STEEL**

Manufactured by
**STEEL SHOT PRODUCERS, Inc.**
Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

*Sold and recommended by*
*Pangborn Corporation, Hagerstown, Md.*

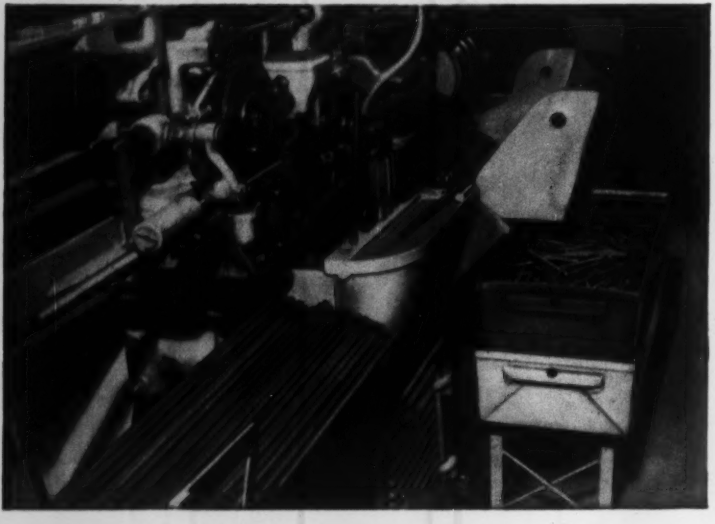
# How "MASTER" put a

# USS Amer-Led hikes



Feed end of the Brown and Sharp automatic screw machines. A couple of dozen Amer-Led rods can be stacked at one time.

Business end of the screw machines. Increased production was most noticeable here, where shackles are cut, formed and drilled.



Broaching is performed on this Zeh and Hahneman toggle press. Tool life is much greater since use of Amer-Led.

# padlock on costs...

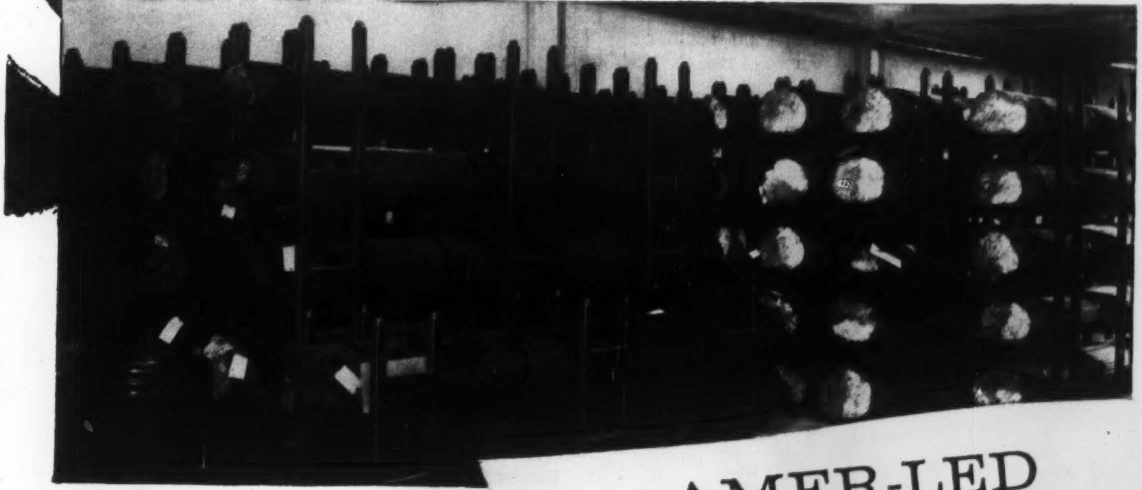
# production 25% to 75%

When American Steel & Wire first developed Amer-Led free machining stock, it was suggested to Master Lock and it worked like a charm. Automatic screw machine production leaped 25% to 75% without any increase in tool wear! The finer grain structure of this new steel permitted more accurate cutting to closer tolerances, and there were fewer rejects, too.

Punch press production increased 15% to 20%, and was limited only by the ability of the operator to feed the machine. Although production was not increased in the broaching operation, tool life was increased.

Of course, this is the story of Master Lock Company. If *you* yearn for results like this, then get in touch with your AS&W representative. Ask about USS Amer-Led.

**◀ Schoolboys can identify a "Master" padlock with its unusual laminated steel case. The shackle is possibly the most important part. Miscreants try to twist it off with a crowbar, or sever it with hacksaw or rasp. Obviously, the shackle must be hard and free from brittleness after heat treatment; and during production it must be ductile and machinable.**



**The Amer-Led is stored as received—in steel strapped bundles. There's a type for most machining operations.**

AMER-LED
SUPER-MACHINING
BARS

**AMERICAN STEEL & WIRE**
DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

*for steel or non-ferrous metals*

# FIVE SPECIAL TITANIUM ALLOYS

Whatever your low-carbon titanium requirement, there's an ELECTROMET titanium alloy to suit your melting practice. ELECTROMET produces three standard grades of low-carbon ferrotitanium, each grade containing a maximum of 0.10 per cent carbon. Of special interest to producers of high-quality forgings are the low aluminum and silicon contents of this alloy, which make ELECTROMET ferrotitanium specially suited for the production of forgings having good mechanical properties.

**ANALYSIS OF "ELECTROMET" LOW-CARBON FERROTITANIUM**

| Element | 30% Titanium Grade | 50% Titanium Grade | 70% Titanium Grade |
|---|---|---|---|
| Titanium | 27-32% | 50-55% | 68-72% |
| Aluminum | 0.15% max. | 0.15% max. | 0.15% max. |
| Silicon | 0.10% max. | 0.10% max. | 0.10% max. |
| Carbon | 0.10% max. | 0.10% max. | 0.10% max. |
| Size | 2 in. x Down | 2 in. x Down | 2 in. x Down |

**OTHER TITANIUM ALLOYS**

| Silicon-Titanium | | Manganese-Nickel-Titanium | |
|---|---|---|---|
| Titanium | 40-50% | Titanium | 46.5-48.5% |
| Silicon | 45-50% | Manganese | 6-8% |
| Iron | 3.00% max. | Nickel | 29-31% |
| | | Aluminum | 12.5-14.5% |
| Sizes: | 2 in. x Down,<br>1 in. x Down,<br>20 Mesh x Down | Size: | 2 in. x Down |

ELECTROMET also produces a silicon-titanium and a manganese-nickel-titanium alloy. Silicon-titanium is available for adding titanium to either non-ferrous alloys or steels where the simultaneous addition of silicon is desired. Manganese-nickel-titanium is available for adding titanium to nickel-base high-temperature alloys.

For additional information about ELECTROMET titanium alloys, please contact the nearest ELECTROMET office listed below.

HALF A CENTURY OF DEVELOPMENT IN FERRO-ALLOYS AND METALS
50th Anniversary
Electromet
1906 · · · 1956

**ELECTRO METALLURGICAL COMPANY**
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
OFFICES: Birmingham · Chicago · Cleveland · Detroit
Houston · Los Angeles · New York · Pittsburgh · San Francisco
In Canada: Electro Metallurgical Company,
Division of Union Carbide Canada Limited, Welland, Ontario

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

# Pangborn Rotoblast® Cuts Cleaning Costs $250 a Day for General Foundries!

General Foundries, Milwaukee, Wis., replaced its old cleaning equipment with a Pangborn Rotoblast Table-Room and a Blastmaster Barrel, reducing labor costs and eliminating casting breakage to the tune of $250 a day!

## And $1,500 a month for Specialty Aluminum and Bronze!

Some foundrymen tell us they're most impressed with Pangborn Rotoblast's speed of cleaning, its high production rate. Others praise the quality of its work . . . the manpower reduction due to its automatic operation. But whatever the reasons—cleaning quality, speed, lower labor and maintenance costs, no abrasive loss—they all add up to the fact that Pangborn Rotoblast gives you *lower cost per ton of castings cleaned.* And, in the final analysis, this figure determines the efficiency of your blast cleaning operation.

Investigate Pangborn Rotoblast and discover which machine can best streamline your operating costs! Write for Bulletin 227 to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

At Specialty Aluminum and Bronze Corp., Revere, Mass., the Pangborn Blastmaster Barrel reveals any casting imperfection as soon as blasted. This saves further processing costs. This and other savings total $1,500 a month for the firm!

**Pangborn**

**BLAST CLEANS CHEAPER**

Rotoblast Blastmaster®
& Continuous-Flo Barrel

Rotoblast® Tables
& Table-Rooms

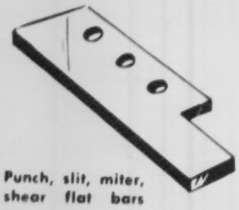
Special Blast Rooms
& Cabinets

Pangborn Dust
Control Equipment

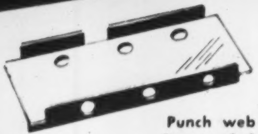
*Distributors for Malleabrasive and Tru-Steel Abrasives*

48

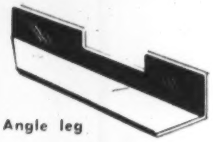
# IF YOU DO ½ OF THESE OPERATIONS



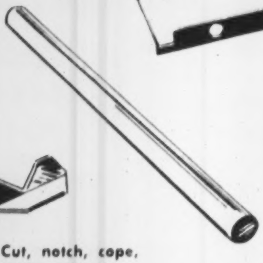
Punch, slit, miter, shear flat bars

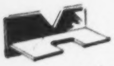


Punch web and flange of channel

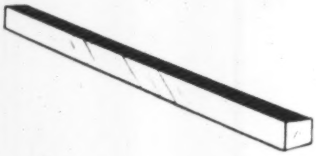


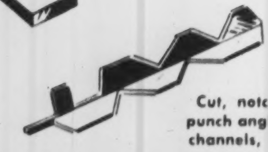
Cope Angle leg



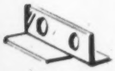


45° Miter





Cut, notch, cope, punch angles, tees, channels, I-Beams



Trim leg of tee

Cut rounds, squares, reinforcing bars

## YOU COULD BE SAVING TIME, SPACE AND MONEY WITH A U.I.W.

Yes, if your shop does only *half* the above fabrication jobs, a "Buffalo" Universal Iron Worker would pay for itself in a hurry. Three men can use it at a time—on three separate operations. It will do up to six operations without tool changes. The only machine with independent built-in notcher and coper, the U.I.W. also has punch head, shear, bar cutter and angle miter with quick pin adjustment. And for the largest capacity work, "Buffalo" also build Unistructural Iron Workers. All are built to the "Q" Factor* standard of strength, convenient handling and freedom from maintenance worries. Write for Bulletin 360-F today!

**The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.*

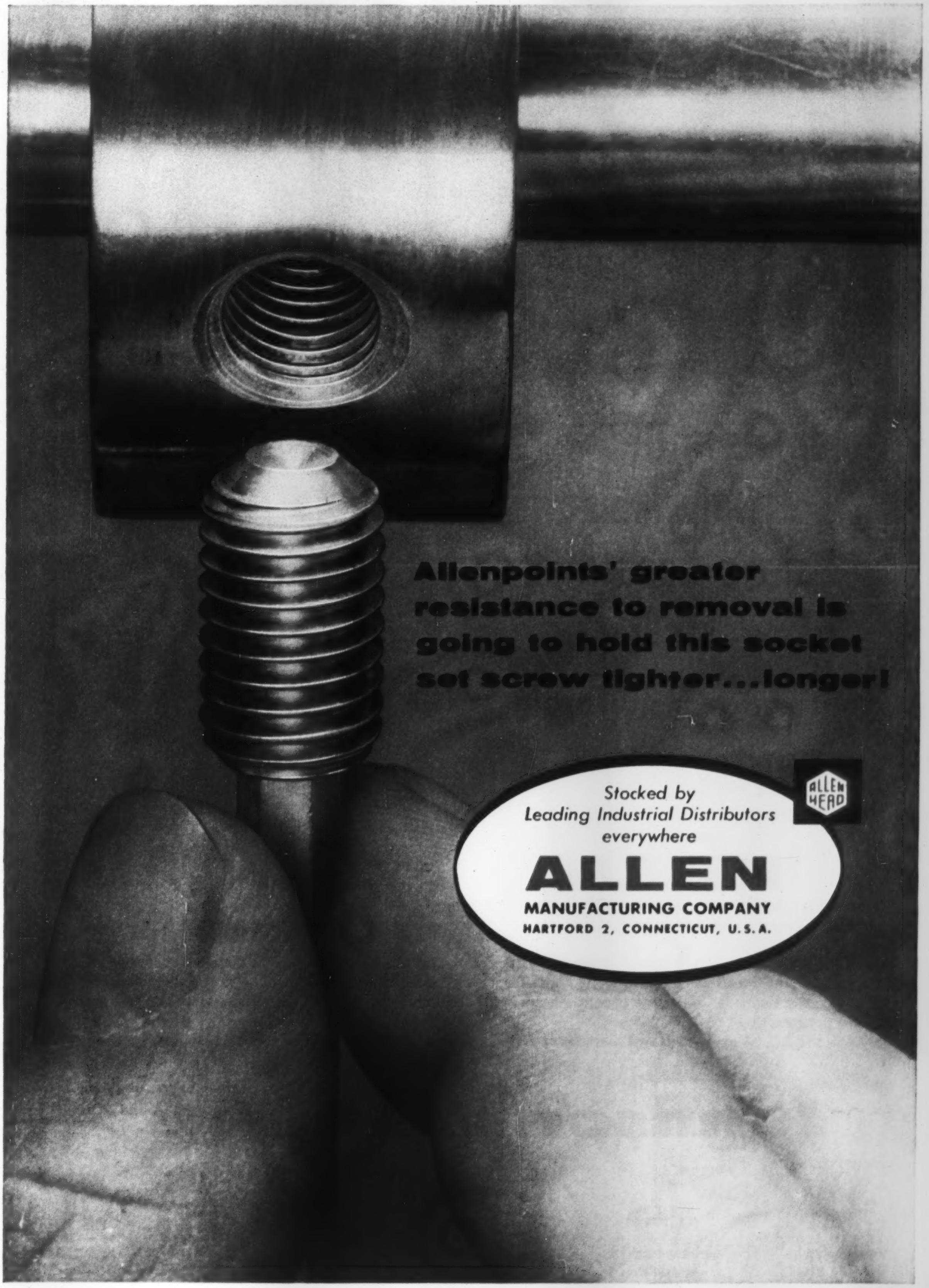
**BUFFALO FORGE COMPANY**

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

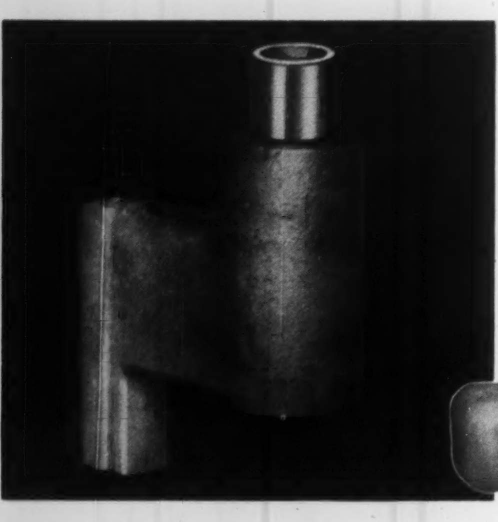


**Allenpoints' greater resistance to removal is going to hold this socket set screw tighter...longer!**

ALLEN HEAD

*Stocked by*
*Leading Industrial Distributors*
*everywhere*

**ALLEN**
**MANUFACTURING COMPANY**
HARTFORD 2, CONNECTICUT, U.S.A.



A Johnson Bronze bushing is inserted in the cut-off lever for a No. 3 Baird four-slide wire forming machine

Baird four-slide wire forming machine.

# Johnson Bearings Help Maintain Baird's Reputation for Building Durable Machinery

The 110-year old Baird Machine Co., of Stratford, Conn., has an enviable reputation for the production of durable wire forming machinery. All of their machines are built to last—*without losing their tolerances.*

"We have to make sure that every part, down to the smallest bolt, is going to stand up just as long as the heavy cast bed of the machine itself," says Mr. Carl F. Johnson, Purchasing Agent for Baird. "Johnson bearings, we've found, fill those requirements. We've never once had a complaint about Johnson's, and we've been using them for a good many years. At the same time, they don't cost a fortune."

Like the one near you, Baird's Johnson Distributor stocks a good supply of a selection from 900 standard cast bronze bearings. As the Baird Purchasing Agent says, "We never worry about our Johnson inventory. It's a simple matter of making a phone call to replenish our supply. This removes a big problem of stock space and inventory control." At the same time, Baird is aware that skilled Johnson field engineering service is available at any time, should a problem arise.

Why not let your Johnson distributor help you to improve the quality of your products while reducing costs—with Standard Johnson Bearings? Johnson Bronze Company, 550 S. Mill Street, New Castle, Pa.

## Johnson Bearings

**GRAPHITED**
over 175 sizes

**GENERAL PURPOSE**
over 900 sizes

**UNIVERSAL BRONZE BARS**
over 400 sizes

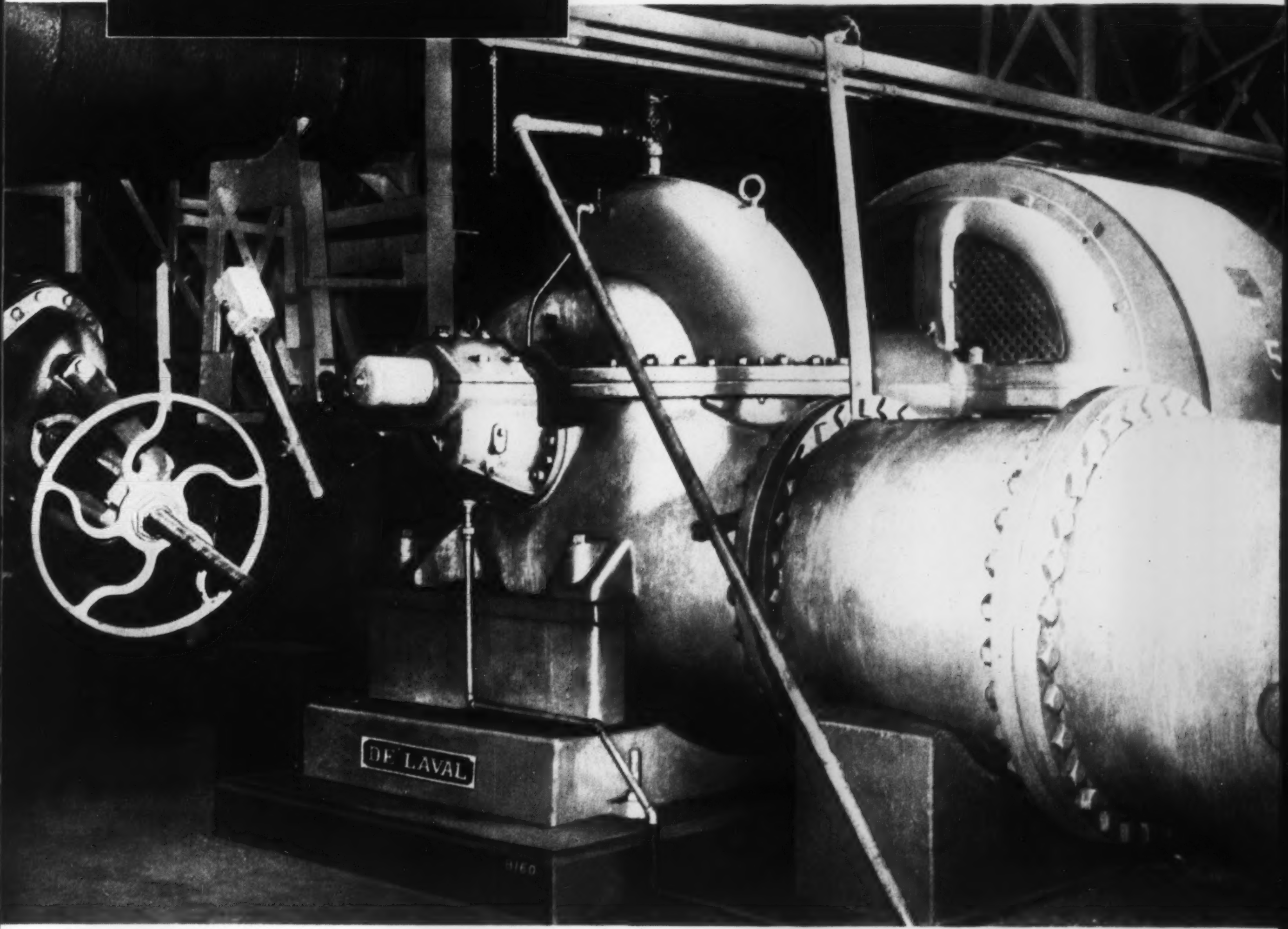
**LEDALOYL**
over 400 sizes

**ELECTRIC MOTOR**
over 350 sizes

**DE LAVAL**

**CENTRIFUGAL PUMPS**

*in service since 1911 at Inland Steel Co.*



De Laval Centrifugal Pumps have a record of dependability at the Inland Steel Co., which goes back forty-five years. In that time, De Laval has supplied this major producer with pumps for practically every steel mill service—*more than 75 units in all.* The photograph shows one of the largest De Laval pumps on the line at the East Chicago, Indiana plant of Inland Steel. The unit delivers 20,000 gpm at 120 ft head.

De Laval Centrifugal Pumps are available for a wide range of applications in all types of metal-working plants. Types L, M and P single stage double suction pumps can handle capacities from 1,000 to 20,000 gpm and heads to 350 feet. Larger De Laval units of any capacity to meet any requirement for steel mill service are available.

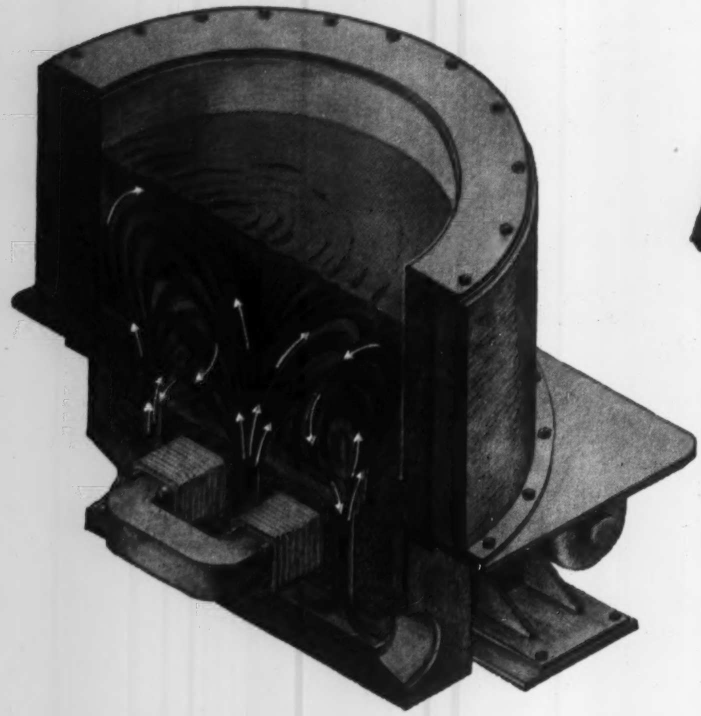
*Send for Bulletin 1004 giving performance and application data.*

**DE LAVAL** *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY
*860 Nottingham Way, Trenton 2, New Jersey*

DL366

# *The Furnace that Stirs Itself!*



## ELECTROMAGNETIC PRESSURE CIRCULATES MOLTEN METAL

*—In this 60 Cycle—*

**AJAX** TAMA-WYATT *Induction Furnace*

Heat is generated only in the melting channels. Controlled stirring (*neither too much nor too little*) guarantees uniformity of metal temperature and alloy composition and also leads to efficient melting of light scrap. Tiresome puddling is eliminated. The metal is held entirely in an inert refractory lining. The atmosphere is cool and free from contaminating gases.

### *No Other Method Enables such Completely*

### CONTROLLED MELTING

Today, AJAX builds a complete line of these time-tested furnaces in standard sizes up to 333 kW for the dependable melting of aluminum, brass, copper and zinc. Units for special applications are carefully engineered to specifications.

## TWIN COIL INDUCTORS

### *Lead Non-Ferrous Melting*

The sectional view above shows the twin coil stirring action of the 100 kW Ajax-Tama Wyatt 60 cycle induction furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electromagnetic circulation as shown by the arrows. The 100 kW furnace shown here, is one of a family of twin coil furnaces available today for melting rates from 300 to 10,000 lbs. per hour.

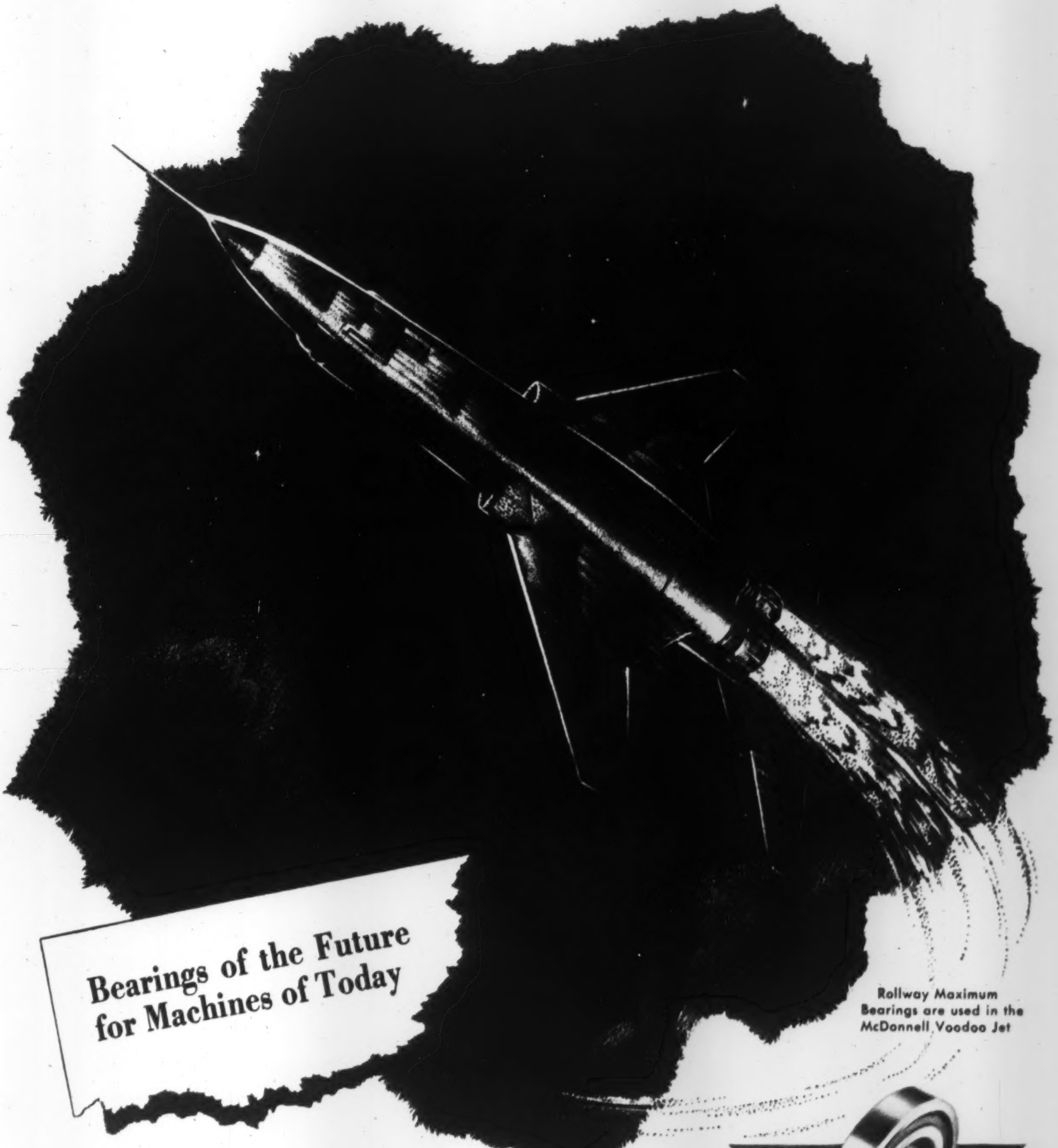
*For Further Information, Send For Bulletin R-43*

**AJAX** TAMA-WYATT

**AJAX ENGINEERING CORP., TRENTON 7, N. J.**

## INDUCTION MELTING FURNACE

| | |
|---|---|
| **AJAX ELECTRO METALLURGICAL CORP.,** | and Associated Companies |
| **AJAX ELECTROTHERMIC CORP.,** | Ajax-Northrup High Frequency Induction Furnaces |
| **AJAX ELECTRIC CO.,** | The Ajax-Hultgren Electric Salt Bath Furnace |
| **AJAX ELECTRIC FURNACE CORP.,** | Ajax-Wyatt Induction Furnaces for Melting |



## Bearings of the Future for Machines of Today

Rollway Maximum Bearings are used in the McDonnell Voodoo Jet

Gunned by higher speeds and higher temperatures, the performance demand for anti-friction bearings rises sharply every year. Here at Rollway, we strive always to keep abreast of the trend, and even to anticipate it. In precision, dimensional stability and simplicity, Rollway Maximum Bearings offer performance based on advanced thinking to original equipment and replacement buyers of today.

Start now, up-grade both your production machinery and your products with Rollway *bearings of the future*. Rollway Bearing Company, Inc., Syracuse 4, N. Y. Manufacturers of a complete line of radial and thrust cylindrical roller bearings.

**ROLLWAY**
*Maximum*
**ROLLER BEARINGS**

**ENGINEERING OFFICES:** SYRACUSE • BOSTON • CHICAGO • DETROIT • TORONTO • PITTSBURGH • CLEVELAND • MILWAUKEE • SEATTLE • HOUSTON • PHILADELPHIA • LOS ANGELES • SAN FRANCISCO

To get clean wipers at the tool crib, this lathe operator must make the hike, then stand in line. Dirty wipers in hand, he makes the trip at least once a day, takes several minutes to do it.

# He has to waste 60 minutes a week

SCOTT WIPERS
SCOTT WIPERS
In two sizes

Easy to distribute

Really soak up oil . . .

SCOTT WIPERS

Always a clean one handy . . .

Just toss 'em in the trash . . .

SCOTT WIPERS

With a carton of 125 clean Scott Wipers at every workbench, daily wiper replacement is often unnecessary. One carton can last for days and a man has a fresh supply right at his fingertips.

# . . . He stays on the job

## *The difference is . . . Scott Wipers*

Check your production line. See how much time the men are forced to waste in order to keep supplied with fresh wiping material.

It adds up to more lost production time than you might think.

Scott Wipers are disposable. A man picks up a carton when he checks in . . . keeps it with him all day long. He uses one Wiper thoroughly—throws it away. Complicated distribution is ended. So is sorting, baling, and laundering.

And with fresh Scott Wipers there's no danger of hidden chips damaging men or metal.

Your local Scott representative or distributor will demonstrate the Scott Wiper in your plant. Call him or mail this coupon today.

*Another quality product of . . .*

**SCOTT PAPER COMPANY**

Scott Paper Company
Dept. W-6, Chester, Pa.

Please send me more information about Scott Wipers.

Name ____________________

Company ____________________

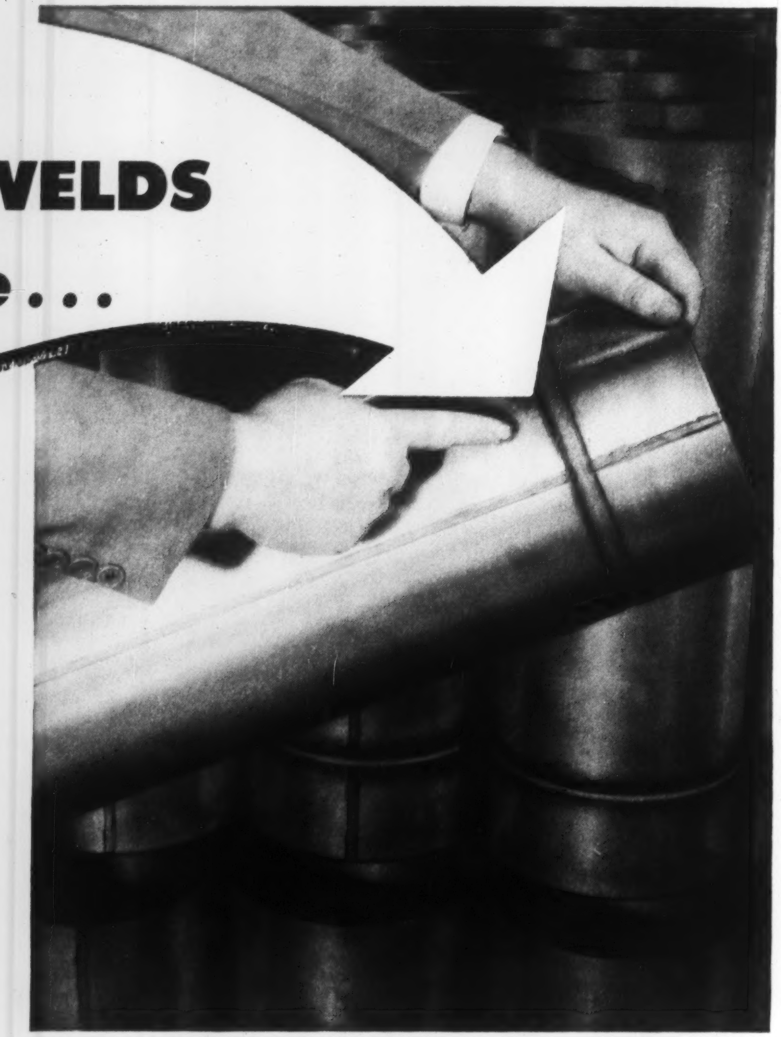
Position ____________________

Address ____________________

# *NOW . . .*

# QUALITY WELDS

## *like these . . .*



**with up to**

**60%**

**LESS**

**SHIELDING**

**GAS**

*H-15 argon-hydrogen mixture means new economy in fast, sound welding operations.*

Using H-15, a LINDE mixture of argon and hydrogen shielding gases, savings as high as 60% of normal gas consumptions are being attained by manufacturers on a wide variety of metal products. This mixture is designed for extremely efficient mechanized welding of stainless steel, Monel, Inconel, and cupro-nickel.

**COMBINES ADVANTAGES**—H-15 mixture combines the high welding speed feature of Helium with the low consumption advantages of argon—result, the lowest cost, high-quality welding yet attained . . . And no extra equipment is needed for a change over to H-15.

Get the complete story of this highly efficient, economical mixture, contact your local LINDE representative. Start saving now—do it today.

**Linde Air Products Company**
**A Division of Union Carbide and Carbon Corporation**
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

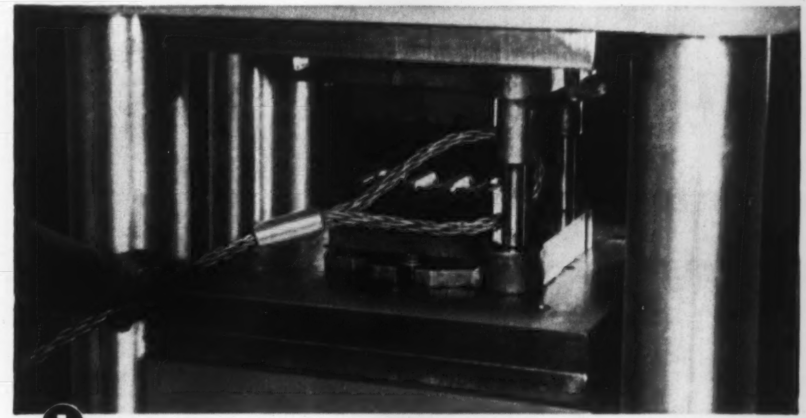
*The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.*

Linde
Trade-Mark

# Tuffy® SLING NEWS

**Vol. 1** Published Monthly in Leading American Trade Magazines by Union Wire Rope Corp. **No. 2**

# NEW Tuffy® FERRULE GIVES EYE SPLICE STRENGTH OF Tuffy® SLING FABRIC



❶ **TREMENDOUS PRESSURE** of this machine in swaging Tuffy's smooth-edged metal ferrule around the tuck splice virtually flows the metal into the braided fabric interstices.

## No Increase in Cost For Smoother, Safer Factory Ferrule Splice

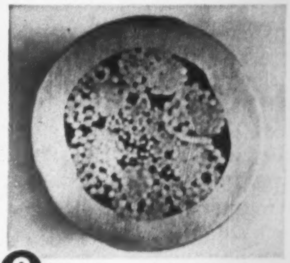
In the most important sling development since Tuffy machine braided wire was introduced, Tuffy now offers sling users greater safety, faster sling handling, and more sling-eye strength—at no increase in price.

It's all made possible by a new steel ferrule used on all Tuffy Slings. This ferrule, slipped over the splice of the eye and pressed on under great pressure, holds so tight that it gives the eye of the sling 100 per cent of the strength of the machine braided wire fabric. The tucked-in splice is completely covered—the swaged ends of the ferrule leave no abrupt edges to catch on loads or to injure workers' hands.

Teamed up with the Tuffy machine braided sling fabric, this new ferrule makes Tuffy the sling handler's favorite for every job.

## Good Man To Know— Your Tuffy Distributor

Tell him your requirements. Then let him save you the time, trouble, and money of carrying an inventory. He will stock the Tuffy Slings you want and Tuffy Hoist Lines to team up with your Tuffy Slings.



❷ The force of friction set up by compressing the ferrule metal on more of the wire fabric surface forms an eye that really stays spliced.

Tuffy Sling
HANDBOOK
SL-NO. 2

## New Tuffy Sling Handbook FREE—Mail Coupon Now

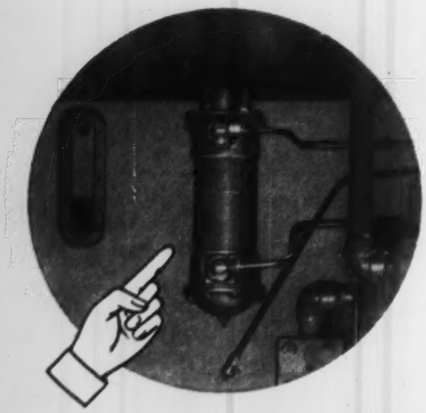
This big 60-page book tells you all about new factory-fitted Tuffy Slings with our pressed-on ferrule and contains complete information about a full line of factory-fitted Tuffy Slings, nearly a dozen new standard fittings, and complete data and charts on all Tuffy Slings. It also has a brand-new engineer's notebook and a valuable rigger's manual. Send for your copy now. No obligation.

**union Wire Rope corporation**

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

2160 Manchester Avenue, Kansas City 26, Missouri

MY NAME__________ TITLE__________
COMPANY NAME__________
ADDRESS__________
CITY__________ ZONE_____ STATE__________ 13



# ROSS EXCHANGER

## keeps oil at optimum working temperature in new Farquhar triple-action drawing press

Widely publicized, this 575-ton Farquhar Triple-Action Drawing Press features a magnetic-hydraulic, servo control system. Six speed changes are provided to simplify the drawing of difficult-to-form metals such as stainless steels, titanium and work-hardening alloys.

Safeguarding press capacity, a Ross Type BCF Exchanger keeps the hydraulic oil at optimum working temperature. Correct viscosity is maintained to insure pump efficiency.

Says A. B. Farquhar Division of The Oliver Corporation, "Ross Exchangers have proved to be an excellent choice. Performance is good. Maintenance is nil. Installation is simple."

Because of their job record for ruggedness and thermal efficiency, Ross Exchangers are regularly furnished with metal drawing presses, die casting machines, extrusion presses, welders, engines, compressors and numerous other types of prime equipment.

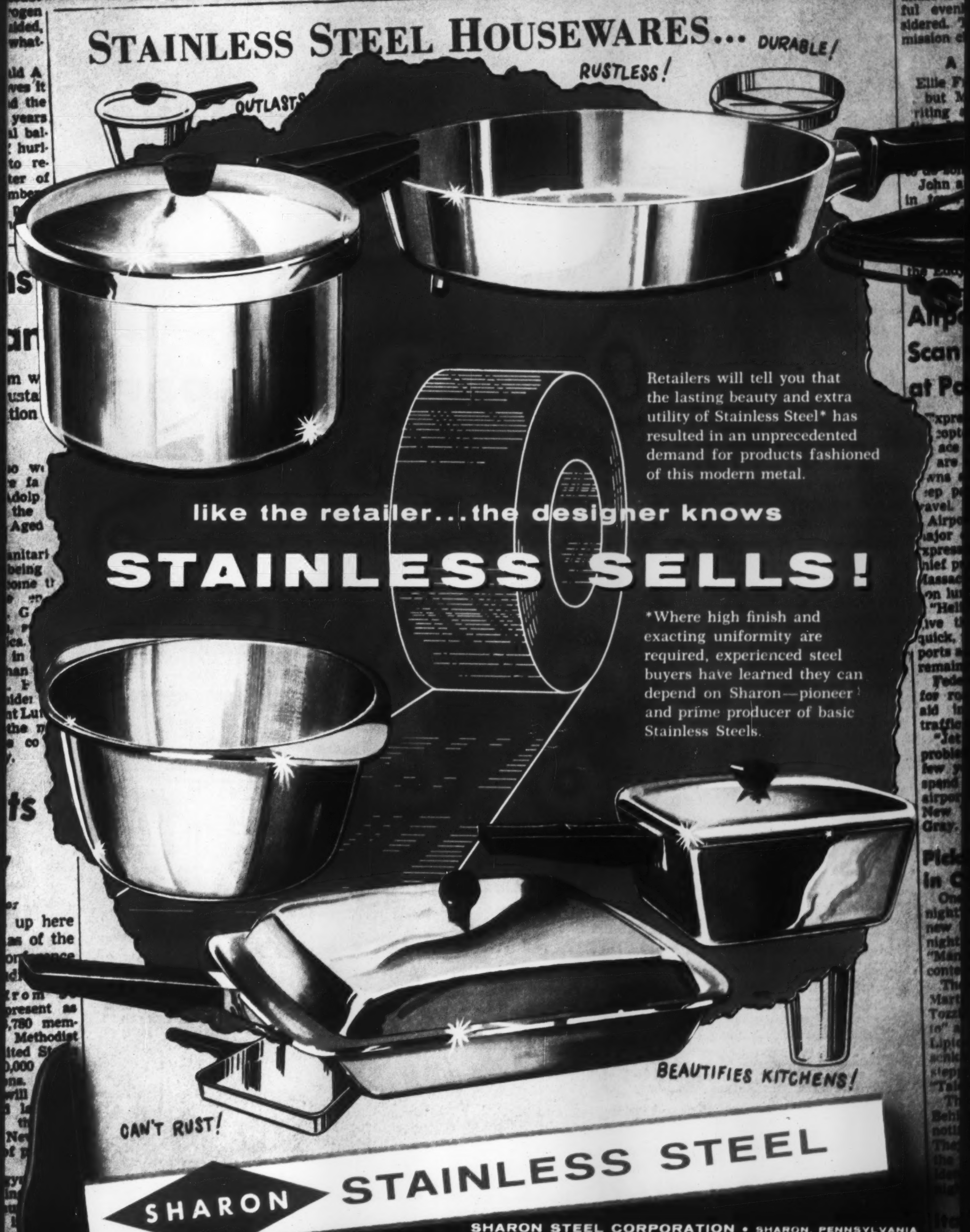
Completely pre-engineered, Ross Exchangers are fully standardized in sizes to meet a wide variety of oil, water, gas and air cooling requirements. Compact in design, they're equipped with convenient connections for ease of installation.

For detailed information, request Bulletin 1.1K5. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N. Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS

ROSS HEAT EXCHANGER PRODUCTS

# STAINLESS STEEL HOUSEWARES...


DURABLE!
RUSTLESS!
OUTLASTS
BEAUTIFIES KITCHENS!
CAN'T RUST!

Retailers will tell you that the lasting beauty and extra utility of Stainless Steel* has resulted in an unprecedented demand for products fashioned of this modern metal.

## like the retailer...the designer knows

## STAINLESS SELLS!

*Where high finish and exacting uniformity are required, experienced steel buyers have learned they can depend on Sharon—pioneer and prime producer of basic Stainless Steels.

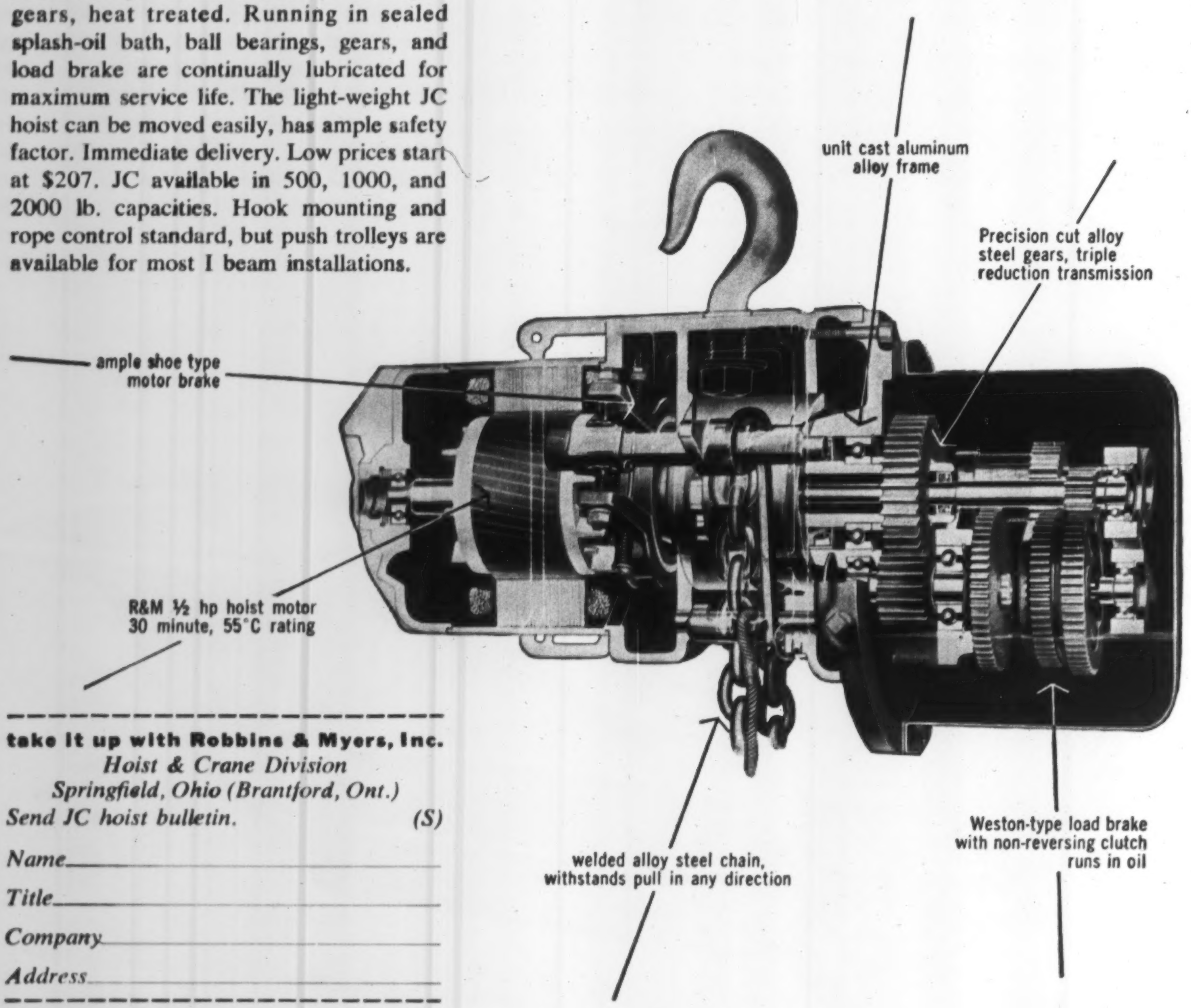
**SHARON** STAINLESS STEEL

**SHARON STEEL CORPORATION • SHARON, PENNSYLVANIA**

DISTRICT SALES OFFICES: Chicago, Cincinnati, Cleveland, Dayton, Detroit, Grand Rapids, Indianapolis, Los Angeles, Milwaukee, New York, Philadelphia, Rochester, San Francisco, Sharon, Seattle, Montreal, Que., Toronto, Ont.

R&M JC chain hoists are ahead of competition in quality—right with it in price. See for yourself why more value for the same money is yours in the JC. The ½ hp R&M heavy duty motor is equipped with an oversize shoe brake to assure quick stops, accurate load spotting, longer life. Separate load brake is Weston-type, with non-reversing clutch to prevent drift. Gearing—triple reduction precision cut alloy steel spur gears, heat treated. Running in sealed splash-oil bath, ball bearings, gears, and load brake are continually lubricated for maximum service life. The light-weight JC hoist can be moved easily, has ample safety factor. Immediate delivery. Low prices start at $207. JC available in 500, 1000, and 2000 lb. capacities. Hook mounting and rope control standard, but push trolleys are available for most I beam installations.

# quality to spare


unit cast aluminum alloy frame
Precision cut alloy steel gears, triple reduction transmission
ample shoe type motor brake
R&M ½ hp hoist motor 30 minute, 55°C rating
Weston-type load brake with non-reversing clutch runs in oil
welded alloy steel chain, withstands pull in any direction

**take it up with Robbins & Myers, Inc.**
*Hoist & Crane Division*
*Springfield, Ohio (Brantford, Ont.)*
*Send JC hoist bulletin.* *(S)*

*Name*____________________
*Title*____________________
*Company*____________________
*Address*____________________

**ROBBINS & MYERS** **hoists • cranes • winches**

# STEP UP Metal-Sawing Production in ALL of 7 ways:

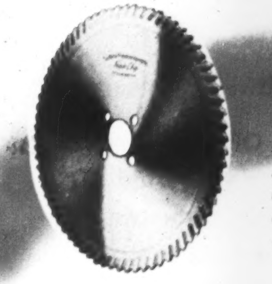
MOTCH AND
THE MERRYWEATHER
MACHINERY CO
CLEVELAND O U.S.A.
MODEL 2-8

• *The New No. 2-8 Automatic Motch & Merryweather Circular Sawing Machine.*

1. **LESS TIME**
2. **LOWER TOOL COST**
3. **MILLED FINISH**
4. **BURRLESS ENDS**
5. **NEGLIGIBLE WASTE**
6. **PERFECT PARALLELISM**
7. **ACCURATE LENGTHS**

## THE MOTCH & MERRYWEATHER *Triple-Chip* METHOD DOES JUST THAT!

**CAN YOU EQUAL THIS {TIME / COST} BY ANY OTHER METHOD?**



*Material* — 5" dia. SAE 1020

*Cutting time* — 34 seconds

*Tool cost per piece* — $ .019

*IMPORTANT:* Resharpening costs and all other tool costs are included.

ALWAYS—*it's your cost per cut that counts.* To determine that cost, all seven yardsticks listed above must be applied. You must increase usable production, get uniform accuracy, and reduce sawing costs. The Motch & Merryweather Triple-Chip Method out-performs and out-saves all others in the sawing of metal. Let us convince you.

**THE MOTCH & MERRYWEATHER MACHINERY CO.**

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

**BUILDERS OF AUTOMATIC PRECISION CUT-OFF, MILLING, AND SPECIAL MACHINERY**

# "We have no operating problems

*Midwest Metal Stamping reports results of 8 years of press operation using STANOIL*

In 1948, Midwest Metal Stamping Company, Kellogg, Iowa, put into service a Bliss Hydro Dynamic Press. STANOIL Industrial Oil was selected as the hydraulic medium. The initial fill was 1,400 gallons. The press operated continuously from 1948 until Christmas, 1954, when it was shut down five days for overhaul.

**At the time of overhaul,** the STANOIL Industrial Oil was drained. And here STANOIL's superior demulsibility was demonstrated. Due to the high rate of condensation, two barrels of water were removed from oil reservoir. An oil analysis in the Standard Oil laboratory proved the oil still suitable for continued service. After filtration, it was returned to the reservoir and the press put back in operation. STANOIL continues to deliver the same perfect performance for Midwest as before.

**STANOIL Industrial Oil** can perform just as efficiently for you. Find out. There is a Standard Oil industrial lubrication specialist near you in any one of the Midwest and Rocky Mountain states. Call him. Or write Standard Oil Company, 910 South Michigan Ave., Chicago 80, Illinois.

Stamping being removed from press by operator George Johnson. Press has used STANOIL Industrial Oil as hydraulic medium for eight years. Oil has perfect performance record.

# when we use STANOIL Industrial Oil"

Don Foster, Midwest Stamping Purchasing Agent and Jesse Nelson (right), Standard Oil industrial lubrication specialist, display metal blank and finished tub turned out on Bliss press. Technical service on lubrication problems is Jesse Nelson's job. He's been doing such work for seven years. Jesse has an engineering degree from the University of Iowa and is a graduate of the Standard Oil Sales Engineering School. Customers find this experience and training pay off *for them.*

STANDARD

**STANDARD OIL COMPANY**
(Indiana)

### *Quick facts about* STANOIL *Industrial Oil*

- **Special refining and an additive, exclusive with STANOIL, make this industrial oil resistant to chemical change.**
- **In all grades of STANOIL that need it, an advanced type corrosion inhibitor is added. Inhibitor "plates out" on metal surfaces, prevents rust.**
- **Selective refining and special additives give STANOIL low pour point. STANOIL flows freely at low temperatures.**
- **High viscosity index of STANOIL is indication of the oil's ability to resist change at any operating temperature.**
- **No foam, no emulsion with STANOIL. STANOIL's special additive and selective refining minimize or eliminate these oil problems.**
- **Low carbon forming tendencies of STANOIL reduce or eliminate this problem.**

# *Quantity* PRODUCTION *of* GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

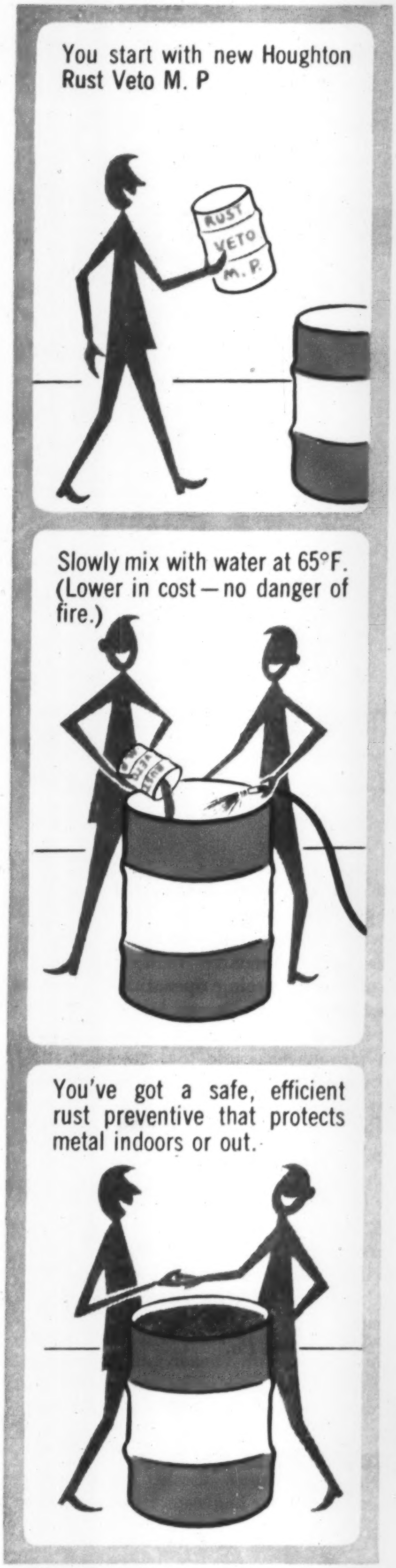
*

ESTABLISHED 1866

**THE WHELAND COMPANY**

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE


You start with new Houghton Rust Veto M. P
RUST VETO M. P.
Slowly mix with water at 65°F. (Lower in cost — no danger of fire.)
RUST VETO
You've got a safe, efficient rust preventive that protects metal indoors or out.

mix with WATER

to

PREVENT RUST

Rust Veto M.P., an amazing new Houghton product, blends with water to produce a completely dependable rust preventive with an exceptional range of uses.

New Rust Veto M.P. can also be used undiluted, or it mixes readily with solvent or oil for easy adaptation to many different applications. You can use it as the base for an extremely effective water displacing compound . . . as a fingerprint suppression compound . . . for long-term indoor rust protection and temporary protection outdoors.

Rust Veto M.P. actually protects metal surfaces best when mixed with water. It improves plant safety . . . is the latest achievement in a long line of rust preventives developed by Houghton over the past 85 years . . . including the famous Cosmoline series meeting Government Specifications.

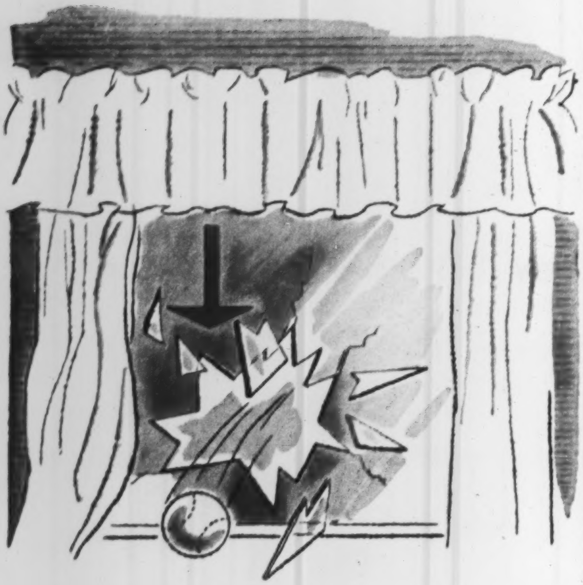
Ask your Houghton Man to tell you about exceptional versatility of new Rust Veto M.P. Call him today—or write E.F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Penna.

RUST VETO M. P.

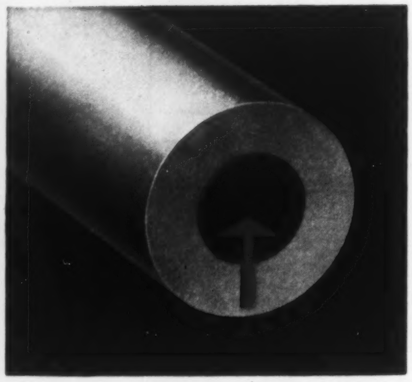
. . . a product of

E F HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

*Ready to give you on-the-job service . . .*



a hole here means work...



a hole here saves work

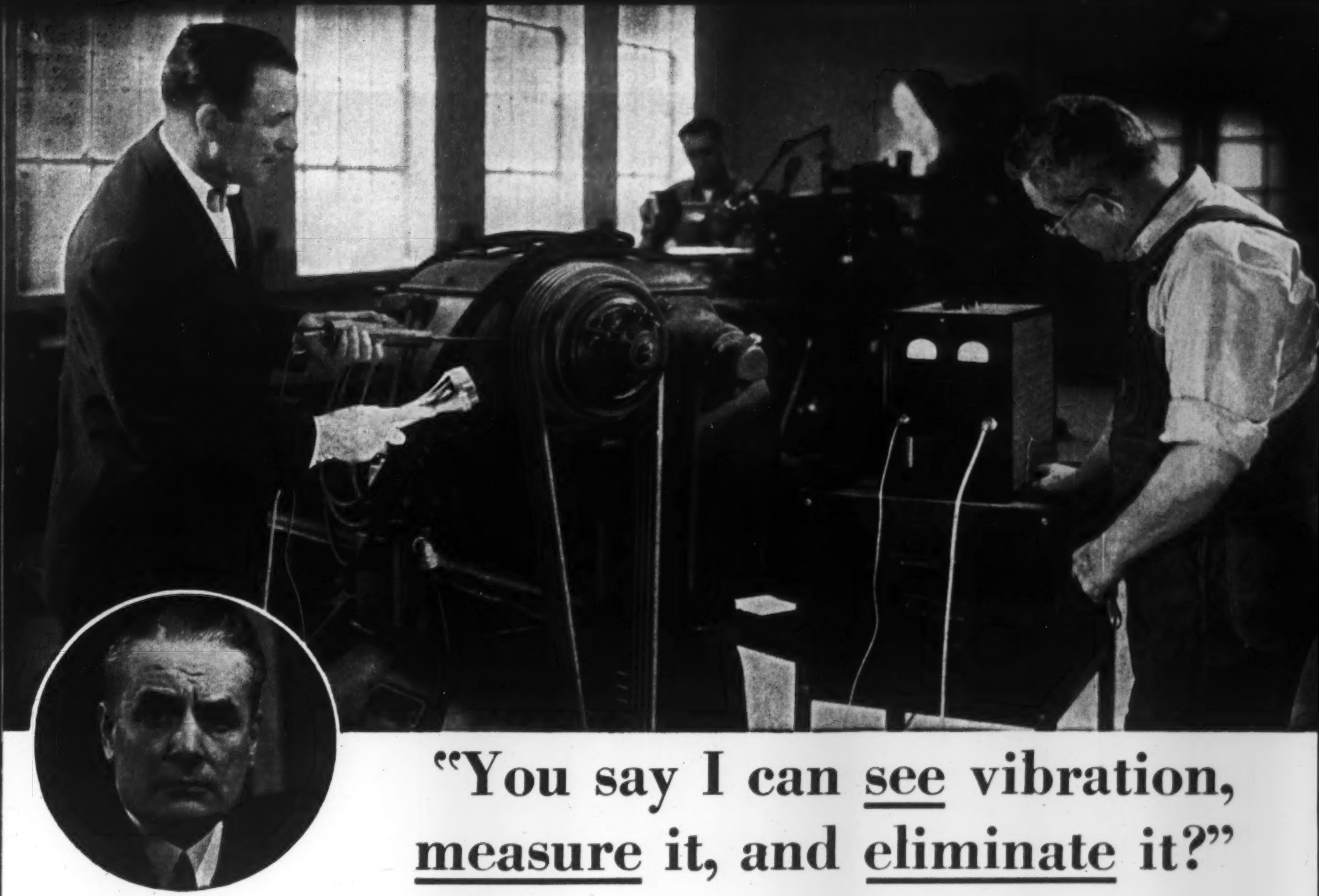
***Crucible Hollow Tool Steel Bars*** take much of the work out of making ring-shaped steel parts, or tools with a center hole. The hole's already there. You save expensive drilling, boring, cutting-off and rough-facing operations . . . you reduce machine time and scrap losses.

You can now get Crucible Hollow Tool Steel Bars in any of the famous Crucible tool steel grades, in virtually any I.D. and O.D. combination. And you can get *immediate delivery* from stock of the five most useful grades — KETOS oil-hardening . . . SANDERSON water-hardening . . . AIRDI 150 high-carbon, high-chromium . . . AIRKOOL air-hardening . . . NU DIE V hot-work tool steels.

Your Crucible representative can quickly show you how Crucible Hollow Tool Steel Bars will save you work and money. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

**CRUCIBLE** first name in special purpose steels

**Crucible Steel Company of America**



# "You say I can see vibration, measure it, and eliminate it?"

## 1 "How much vibration do you think my machine has?"

No need to guess—the Veelos Vibration Analyzer shows exactly! This amazing electronic tester measures vibration amplitude down to *2-millionths of an inch*—tests one belt against another, actually shows which belt has "invisible shakes" . . . and how much! Don't guess about vibration; it's costing you hard cash every minute you ignore it. Ask your Veelos salesman to test your belts with the Vibration Analyzer.

## 2 "Isn't vibration caused by a number of things?"

Vibration can be caused by bearings, motor, clutch, sheaves or V-belts. Quite often it is caused by V-belts alone. The Veelos Vibration Analyzer uses a "strobe" light which "stops" the motion—shows exactly *what* is vibrating! It shows you precisely how much vibration you're paying for, and lets you correct it. The Vibration Analyzer gives positive proof, and the test takes only 15 minutes. It's free, of course.

## 3 "How do I eliminate costly belt vibration?"

Install Veelos, in place of ordinary V-belts! V-belts have spots of varying density, due to their construction, which throw them out of balance. Veelos belts are absolutely uniform; every stud and link is identical; *every foot of the reel* is identical and uniform; and they're perfectly balanced! Test any belt for vibration against Veelos—you're in for a shock. Your Veelos salesman will show you how to cut costs and improve your operation.

© M.M.&B. Co. 1956

**VEELOS®**
THE BALANCED
LINK V-BELT

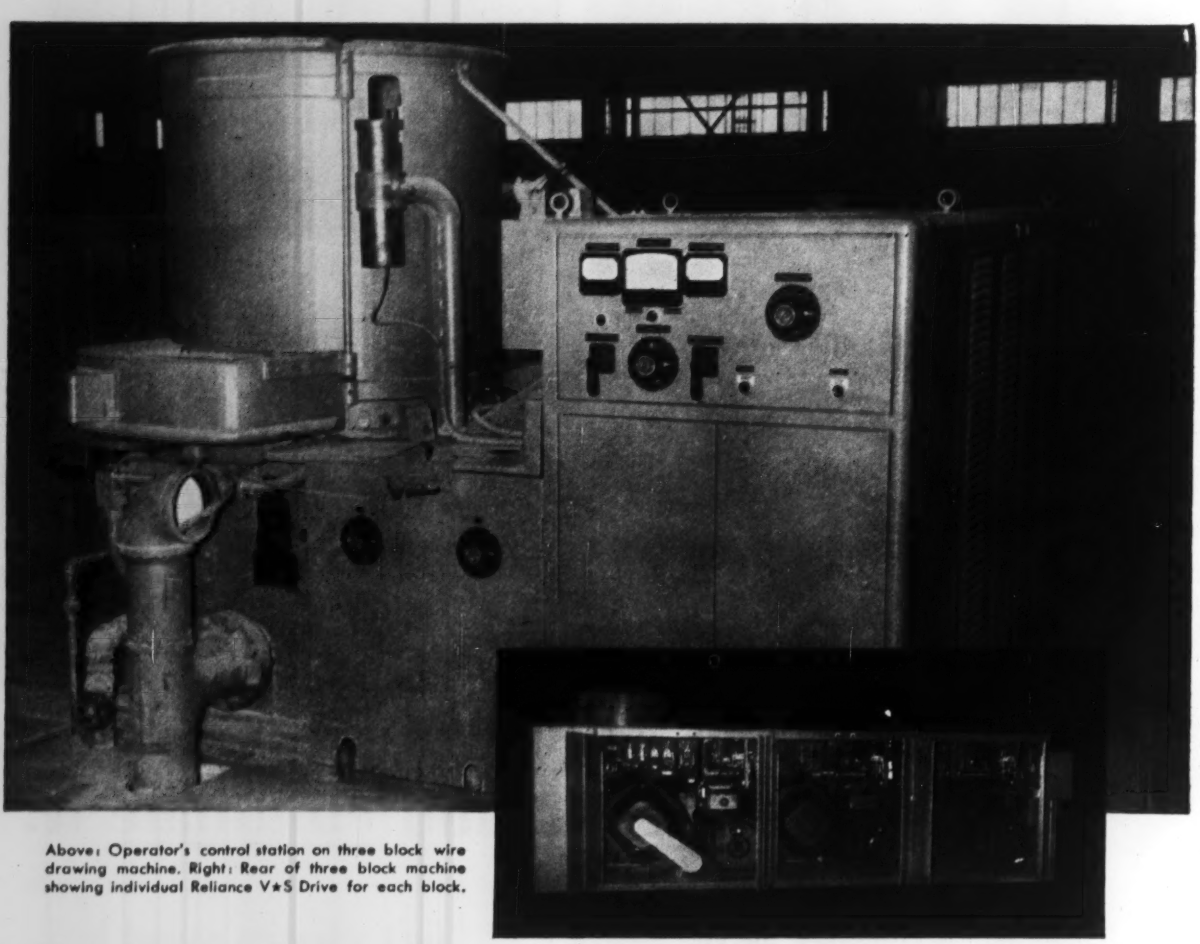
Veelos is known as
Veelink outside U.S.A.

For free vibration analysis or
Veelos Data Book write to:

**MANHEIM**
Manufacturing & Belting Company
209 Stiegel St., Manheim, Pa.

*"Industrial Belt
Specialists Since 1911"*

**Adjustable to any length • Adaptable to any drive • Balanced power • Constant power • Vibrationless power**



**Above:** Operator's control station on three block wire drawing machine. **Right:** Rear of three block machine showing individual Reliance V★S Drive for each block.

# HIGH SPEED MOTO BLOX EQUIPPED WITH RELIANCE V★S DRIVES

With top machine speeds of over 4000 ft. per minute position control of block drives must be accurate and dependable. That is why Reliance V★S Drives are used on this type of cold drawing installation.

Converting power line a-c. to controlled d-c., the built-in V★S Drives individually control each capstan's speed. Yet all drives are interlocked to provide uniform machine speed and stop and start control.

This highly accurate drive system provides variable machine operating speeds from crawl speed to the record smashing 4000 ft. per minute. This span of operating speeds keeps the machine flexible, permitting the selection of the correct drawing speed for a wide range of wire diameters and types of steel.

Dependable, economical, Reliance V★S Drives are powering all types of steel finishing machines. Whether it's wire drawing machines or rolling mills, your best drive is a Reliance V★S Drive.

May we send you our bulletin D-2311.

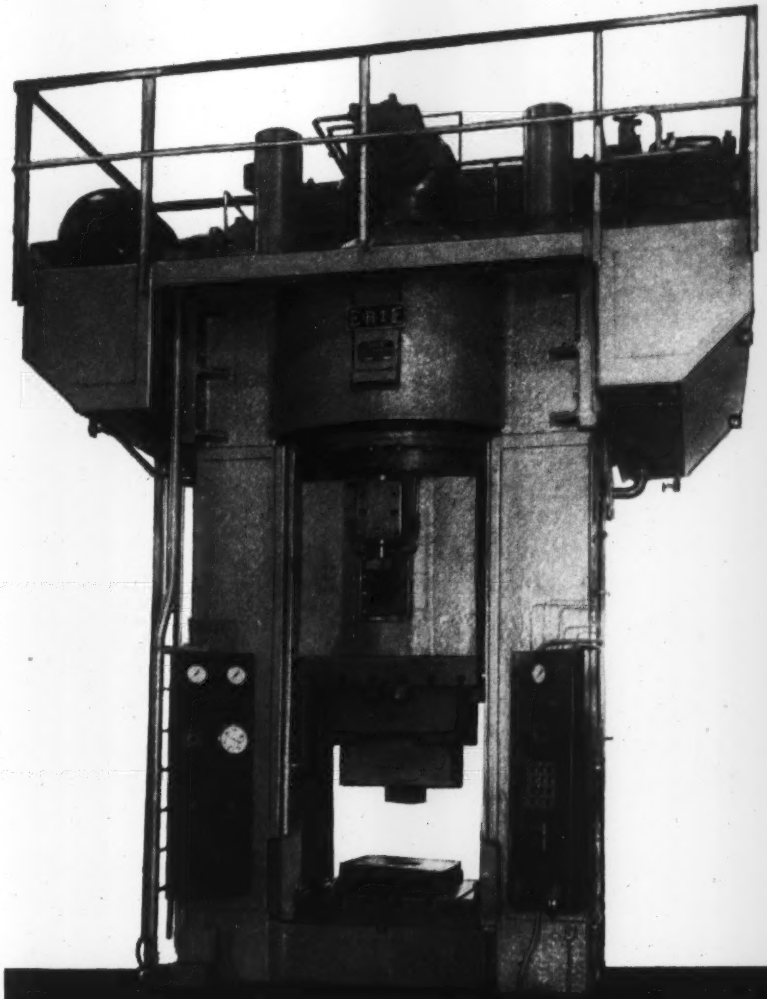
D-1881

RELIANCE V★S DRIVE®

**RELIANCE ELECTRIC AND ENGINEERING CO.**

**DEPT. 411A, CLEVELAND 10, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO**

**Sales Offices and Distributors in Principal Cities**



**ELECTRO-MAGNETIC CONTROL**

All controls are grouped on one accessible control panel which allows delicate finger-tip control by the operator . . . the machine responds *instantly.* This control allows any speed of ram travel in either direction.

**SEMI-AUTOMATIC OPERATION**

The forging cycle can be pre-set to incorporate any speed and tonnage—advance, press, slow return, fast return.

**REMOTE MANUAL CONTROL**

Manual control is easily detached from the control panel by the operator who is free to control the press from any nearby position.

**HYDRAULIC TOP & BOTTOM STRIPPERS**

Can be set to eject the forging from the die at *any* position.

**NEW ADJUSTABLE GUIDES**

Insure accurate platen alignment and *requires no shimming.* Adjustment can be made in less than an hour.

# ERIE FOUNDRY'S NEW HYDRAULIC PRESS

*with electro-magnetic control*

## produces precision forgings

**1500-TON FORGING PRESS**

| | |
|---|---|
| platen size: | 48" x 48" |
| opening: | 60" |
| stroke: | 48" |
| speeds—advance: | 400" per minute |
| press: | adjustable from 0" to 52" per minute |
| slow return: | adjustable from 0" to 52" per minute |
| fast return: | 360" per minute |
| hydraulic components: | Oilgear with Raytheon Servo-control |

The Erie Foundry Hydraulic Forging Press was specially designed for no-draft non-ferrous forging. Modifications of this rigidly built, self-contained machine can be supplied to your forging requirements. For more information, please write.

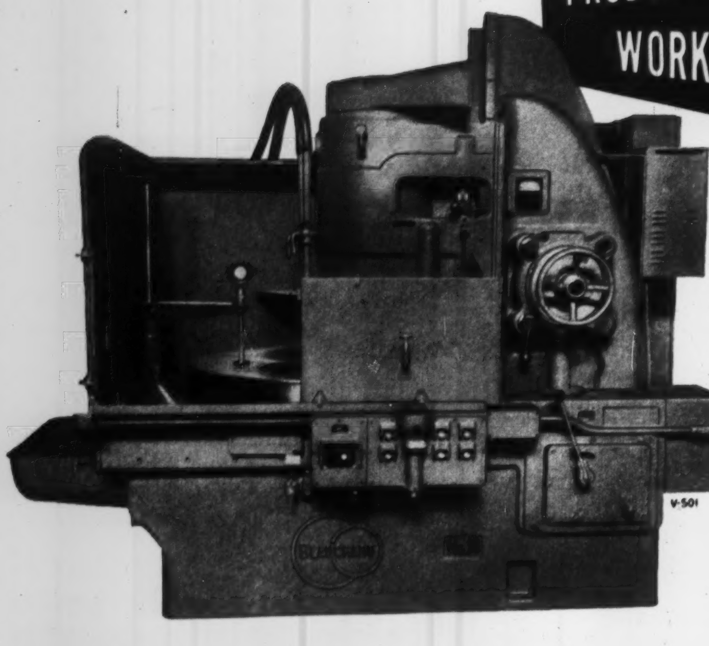
*Hydraulic Press Division*

**ERIE**

**ERIE FOUNDRY CO.**
**ERIE, PA.**

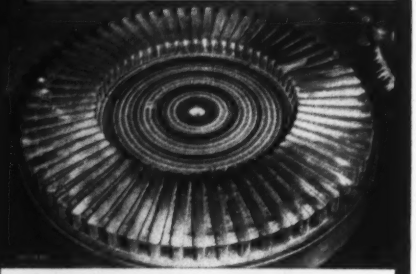
GREATEST NAME IN FORGING MACHINERY SINCE 1895

# for BEST results in surface grinding...
# *PUT IT ON THE BLANCHARD*



## PRODUCTION WORK

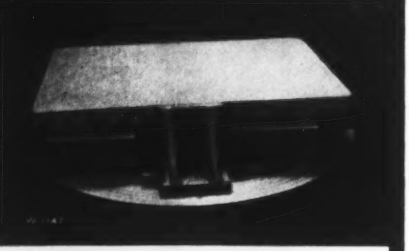
**SIDE PLATES.** 9" x 18" plates ground from rough on No. 18 Blanchard with 36" chuck. Stock removal 1/16" to 1/8" per side. Held flat within .003", parallel to .001", and to dimension tolerance of ±.001". Production: 30 surfaces per hour.



**CONNECTING LEVERS.** Cast iron levers ground in special magnetic fixture with pins located in "vee's". Stock removal per side is 1/32" to 1/16"; must be flat and at right angles to pins. No. 18 production: 180 pieces per hour, compared to 20 pieces per hour by former method used.

## MAINTENANCE AND ODD LOT WORK

**NARDENED STEEL PUNCHES.** This 24-13/16" dia. punch, reground on a No. 18, is centered radially on 36" magnetic chuck. Duplicate circumferential and radial shear reliefs are generated with two setups.



**GRANITE SURFACE PLATES.** A No. 18 Blanchard reconditions this 18" x 34" granite surface plate by grinding it flat within .0002". 3/16" of stock is removed in 5 hours.

Blanchard Grinders are used throughout industry on surface grinding jobs that demand the utmost in production, finish and accuracy.

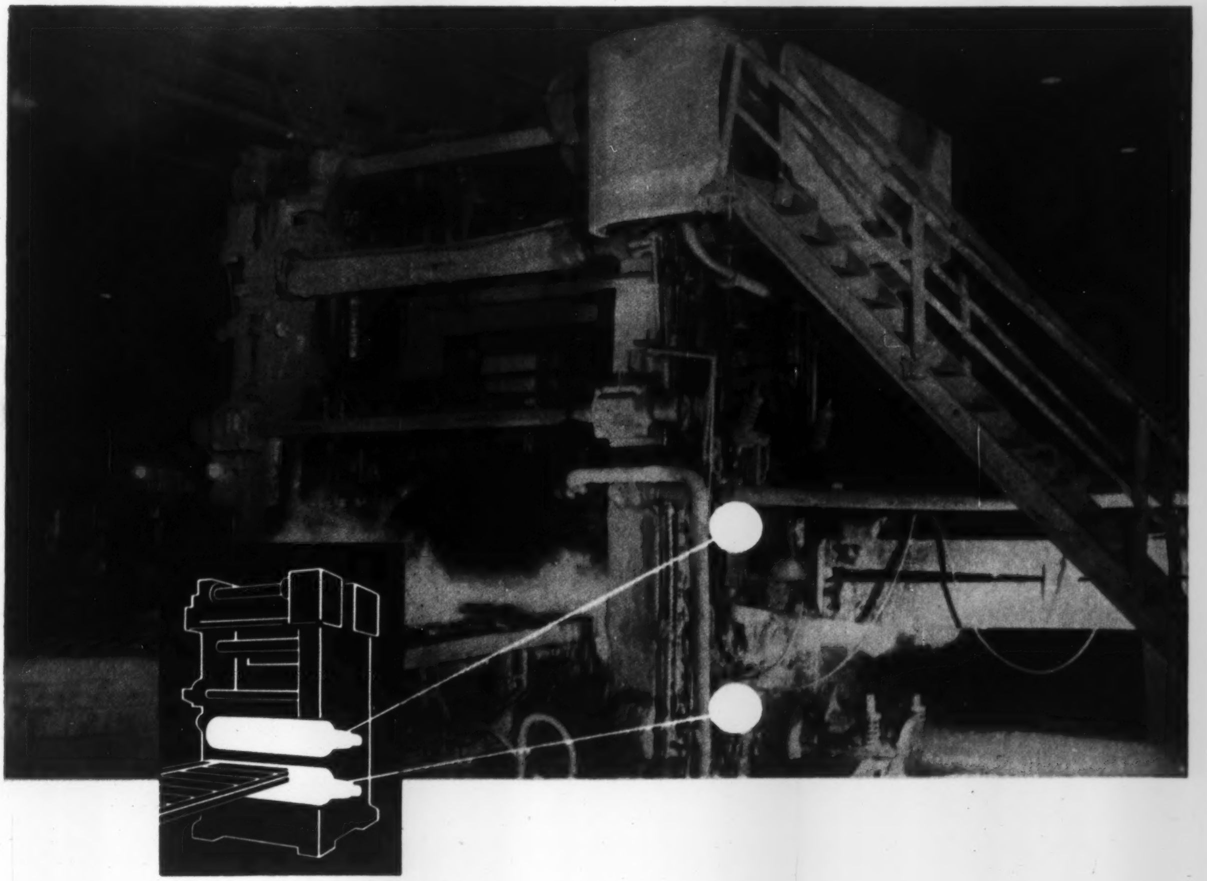
Whatever *you're* surface grinding, there's a Blanchard designed to do the job speedily and accurately.

***PUT IT ON THE* BLANCHARD**

*Send for free copies of "Work done on the Blanchard", fifth edition, and "The Art of Blanchard Surface Grinding".*

**THE BLANCHARD MACHINE COMPANY**
**64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.**

# Lubricating roll necks is no easy job



Lubricating the roll necks of a steel mill calls for a lubricant that will resist high temperatures. The lubricant must also function in the presence of steam, water, mill scale and other abrasive materials. It has to cushion great shock loads and cling tenaciously to the bearings it protects. It must last a long time . . . and it must be economical in use.

Atlantic Lubricant 10 performs exceptionally well in this service. It is being used in a pressure system on the mill illustrated, at the Lukens Steel Company in Coatesville, Pa., for the lubrication of roll neck bearings, pinion and spindle bearings.

Selecting the correct lubricant for the job is simplified when you call in your Atlantic Lubrication Engineer. He is a man with years of on-the-job knowledge of heavy industrial lubrication requirements of all kinds.

Why not see for yourself the value of Atlantic service? Just write, wire or phone the office nearest you for full information. The Atlantic Refining Company, Dept. S-11, 260 South Broad Street, Philadelphia 1, Pa.

**PROVIDENCE, R. I.**
430 Hospital Trust Bldg.

**SYRACUSE, N. Y.**
Salina and Genesee Sts.

**READING, PA.**
First and Penn Aves.

**PITTSBURGH, PA.**
Chamber of Commerce Bldg.

**ATLANTIC**

**LUBRICANTS · WAXES**
**PROCESS PRODUCTS**

# EXIDE-IRONCLAD BATTERIES

## For electric industrial truck operation

**Actual photo taken during vibration torture test on an Ironclad Battery**

**Section of Ironclad positive plate**

## Vibration can't loosen active material — can't shorten battery life

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

When a heavy duty storage battery gets the "shake treatment," battery life is literally at the mercy of the bond between the positive grid and the active material. Heavy shedding means short life.

But look what happens in an Exide-Ironclad Battery. Active material is held firmly captive inside the plastic power tubes. Hair-thin slits let electrolyte in, but keep active material from falling out. In prolonged vibration tests, this unique design has proved to be a valuable battery life stretcher. These findings are confirmed in the long, dependable service of Exide-Ironclad Batteries in typical high-vibration applications.

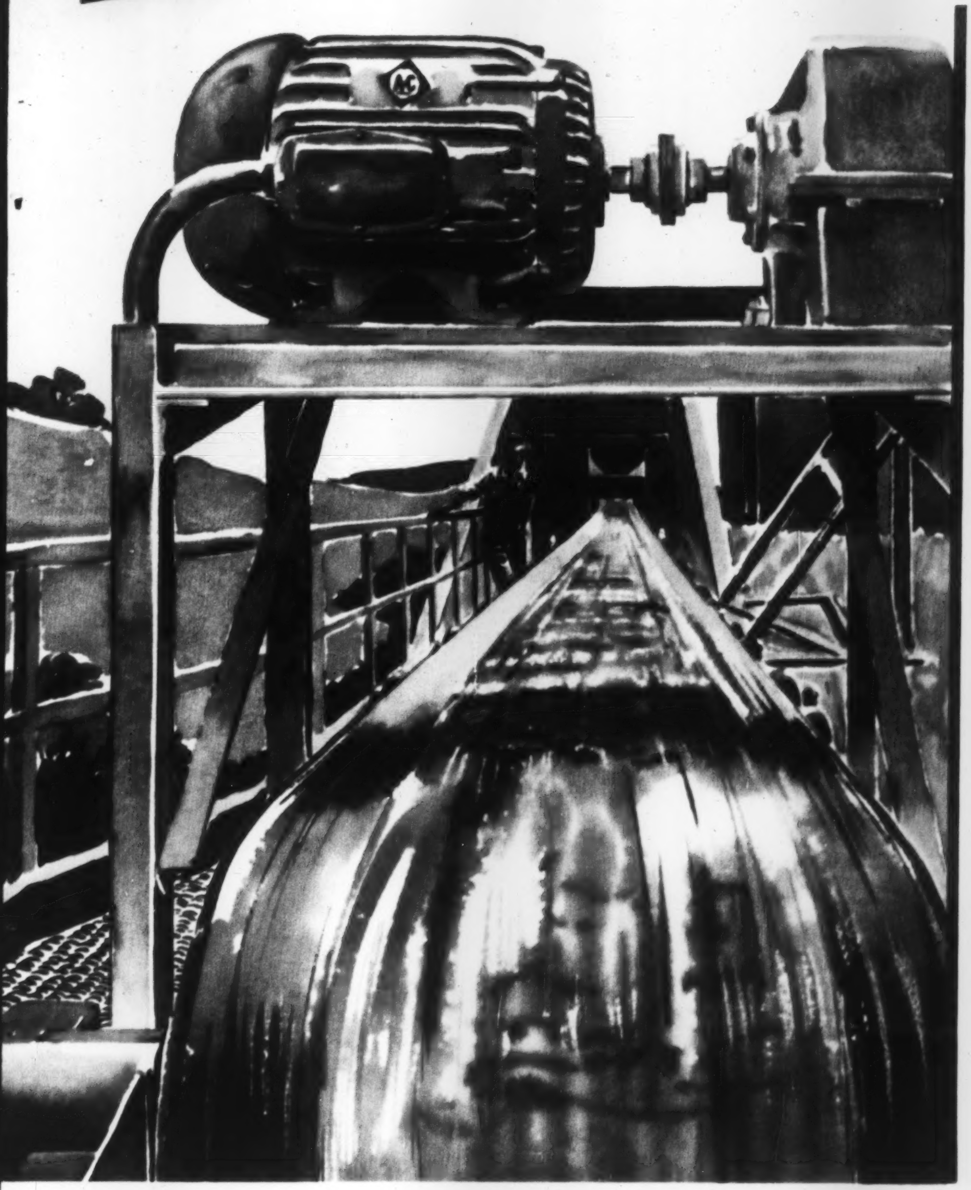
This superior performance is only one of the many extra advantages in Exide-Ironclad Batteries — advantages that have earned them an unmatched reputation for long life and high capacity. When you order heavy duty batteries, or the equipment that requires them, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

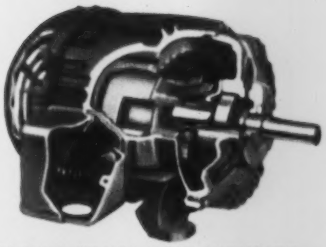
**Exide®**

# There's MORE

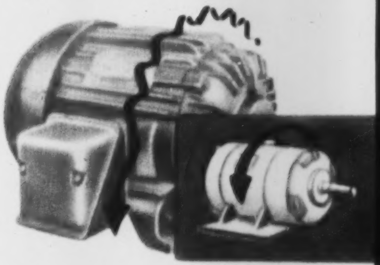
## *'Round-the-Calendar Operation*

## with Allis-Chalmers MOTORS





**MORE IRON AND COPPER** provide double protection against costly breakdowns. Liberal use of cast iron protects against frame distortion, and greater amount of copper increases electrical life.



**MORE COOLING SURFACE** of Allis-Chalmers deep-rib motors makes insulation burnouts highly improbable under normal conditions. There are no external enclosed air passages to become clogged.

ALLIS-CHALMERS
"Certified"
SERVICE SHOP
For Industrial Equipment

**A NATIONAL NETWORK** of Allis-Chalmers Motor Distributors is on the job day and night . . . ready to provide the fast service needed to keep your plant operating 'round-the-calendar.

As a new machinery component or as replacement, specify Allis-Chalmers motors. To find out more, contact your nearby Allis-Chalmers district office, your A-C distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

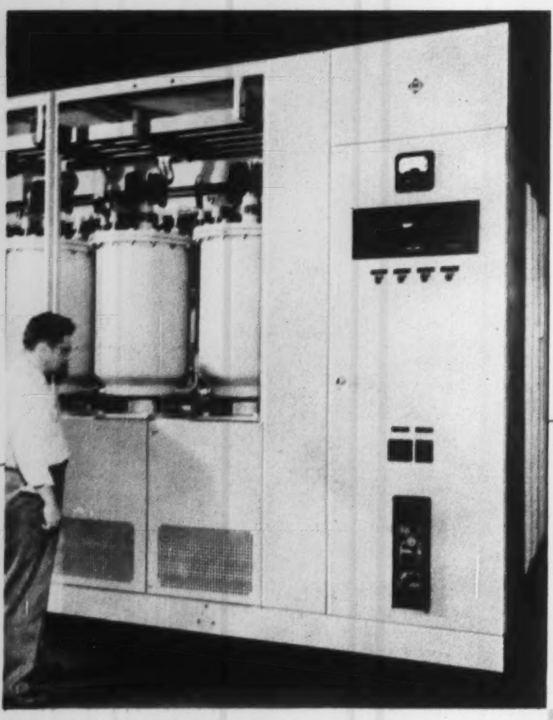
**ALLIS-CHALMERS**

A-C
ALLIS-CHALMERS

A-4906

# Two Separate Circuits Mean

# Reliable Rectifier Operation



ALLIS-CHALMERS

**Mercury Arc Rectifiers**

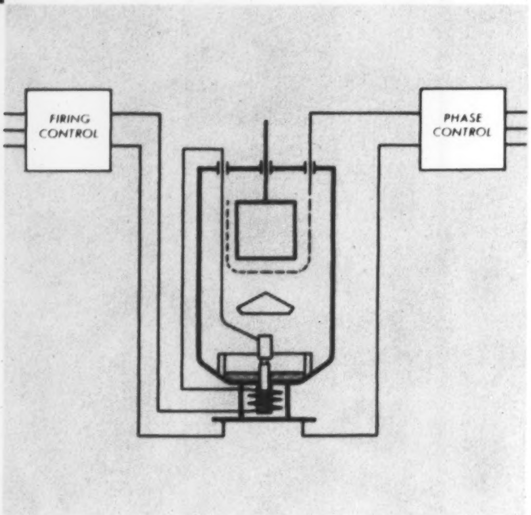
One of four metal-enclosed assemblies in a midwestern installation with a total capacity of 15,000 kw at 620 volts, dc.

## 1. Firing Circuit

A small dc excitation arc is automatically ignited only once, when the unit is started. It is then maintained on the mercury cathode of each rectifier tube. It offers advantages similar to a pilot light. Since it is far easier to maintain an arc than to start it, this feature reduces the chance of the excitron losing excitation during power supply disturbances.

## 2. Phase Control Circuit

A separate circuit utilizes the deionizing grid to obtain phase control. Grid-type phase control permits operation in the clean region near the anode where ion density is lowest, instead of on the surface of the cathode mercury pool where there is turbulence and contamination. Reliability of phase control does not depend on the condition of the mercury. This is an exclusive excitron feature.



**Only Excitron Rectifiers Provide Separate Circuits**

for these two all-important functions. Improved operation results — one function is never sacrificed for the other — you get optimum operation from each.

**For Complete Information** on rectifier operation, call your nearby A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

**ALLIS-CHALMERS**

A-C ALLIS-CHALMERS

A-5136

Another huge dipper for a Marion type 5561 stripping shovel—made entirely of Lukens "T-1" steel for extra strength, impact and abrasion resistance—in the shops of Marion Power Shovel Company, Marion, Ohio.

*Fabricator of power shovels says:*

## "LIKE THE WAY TOUGH LUKENS 'T-1' STEEL WELDS AND HANDLES IN THE SHOP"

■ Marion Power Shovel Company's 45 cubic yard stripping shovels now deliver greater payloads with lower maintenance costs and longer service life at the strip mines. Sixty tons of Lukens "T-1" steel in the dipper stick, bail, door, and the dipper itself do the work that once took many extra tons of ordinary steels. And Marion has experienced "no unusual welding problems since switching to this extremely high yield strength metal . . . very satisfied with the way it handles in the shop."

Lukens "T-1" steel is available in the widest range of plate sizes anywhere. Figure it in your new plans.

**Our 24-page illustrated booklet, LUKENS "T-1" STEEL,** will help show you the way. Write to Manager, Marketing Service, Lukens Steel Company, 846 Lukens Building, Coatesville, Pennsylvania.

Do it now!

**LUKENS "T-1" STEEL** TRADE MARK

LUKENS

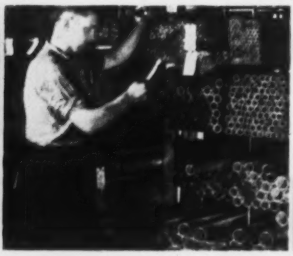
THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

**NOTE ON PRIORITY RATINGS**—When your stainless requirements are covered by a rating, please be sure to extend it on your order to Ryerson. You will be helping yourself by helping to assure future availability of nickel-bearing stainless from Ryerson stocks. Shown here: One Ryerson plant's stainless sheet section.

# for STAINLESS, call Ryerson...

Ryerson stainless bar stocks include free-cutting types, aircraft quality bars—many others.

Any shape can be accurately flame cut from stainless plate with special Ryerson plate burning equipment.



More than 300 miles of stainless pipe and tubing are on hand at Ryerson. Size range: ⅛" through 8⅝" O.D.

Felt pads on Ryerson shears protect the beautiful finish and flatness of Allegheny stainless sheets during cutting.

**here's why:** your call to Ryerson connects you with the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of time-tested Allegheny stainless—carried in tonnages that assure prompt shipment of your warehouse requirements.

... you get the benefit of Ryerson's long experience with stainless—30 years of it, dating from the days when Ryerson pioneered as the first supplier of stainless from stock. All we've learned in that time is at your command when you want help on problems of stainless application or fabrication.

## RYERSON STEEL

PRINCIPAL PRODUCTS: CARBON, ALLOY AND STAINLESS STEELS • MACHINERY & TOOLS • INDUSTRIAL PLASTICS, ETC.

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STEEL

November 5, 1956

# Metalworking Outlook

## Suez: Compounding Steel Troubles?

Look for the Suez crisis to seriously compound steel supply problems. If the program to build 50 supertankers is authorized, it will require 750,000 tons of heavy plate, plus 250,000 tons of other steel products. Lukens Steel Co.'s president, Charles Lukens Huston Jr., points out that the supertankers would require one and one-half times the tonnage of plates the shipbuilding program is taking this year.

## Tight Money: Crimp on Expansion?

Will the increased cost of borrowing money retard capital expansion or improvement plans? Not much, say 67 per cent of the buyers responding to a National Association of Purchasing Agents' query on the matter. The executives believe that planned projects under way are not likely to be modified. They do believe that some projects, planned but not started, may be held up until the turn of the year when another look at business generally, and the profit picture specifically, can be taken.

## What Steel Strikes Do

The impact of the steel strike in the third quarter shows up still more clearly in four more steel company reports on earnings. After provision for taxes, U.S. Steel Corp. had an income of $34.8 million for the period, compared with $89.6 million for 1955's same three months. Bethlehem Steel Corp.: $4.4 million vs. $40.4 million. Jones & Laughlin Steel Corp.: $1.4 million vs. $12.3 million. Pittsburgh Steel Co.: $348,000 loss vs. $2.1 million earnings.

## The Wage Differential Problem

Watch for labor to make a bigger effort to remove differentials that have crept into multiplant and industry wage structures. The United Auto Workers is conducting a survey in auto and auto supplier plants on the matter. Says one top unionist: "Before we began this thing, we thought that at General Motors, for instance, we had done pretty good. We expected a nickel an hour to be the maximum differential. Not so, however." (For more on wage differentials, see STEEL, Oct. 22, p. 45.)

## Quick Hike in Rail Rates May Come

Eastern and western railroad representatives met in Washington last week to draw up plans for a session with the Interstate Commerce Commission. They want a quick grant of part of the 15 per cent rate boost already under consideration by the ICC—specifically, an immediate 7 per cent increase, probably to take effect a month after filing. That would give them

*Technical Outlook—p. 105*    *Market Outlook—p. 175*

additional revenue while the ICC considers the remaining portion. A final decision on it isn't expected until early February.

## Boon to Technology

A new field of research (high temperature alloys for use in jet aircraft) is opened by cancellation of the quota system on tungsten, cobalt, chromium, columbium, nickel and molybdenum. So says R. H. Thielemann, director of research on high temperature alloys in a Tungsten Institute-Stanford Research Institute project. He states that tungsten-base alloys are within the realm of scientific achievement. The lifting of quotas will give aircraft makers more of a chance to use and experiment with the six materials. The Pentagon made the move on quotas Oct. 15.

## Avco Bowing Out of Appliances

Tough competition in home appliances is forcing another manufacturer to bow out. Avco Mfg. Co. will soon discontinue making the Crosley line of refrigerators, freezers, radio-TV receivers and ranges and is negotiating to sell its Bendix line of home laundry equipment to Philco Corp. Avco will continue its other lines.

## Chemical Firms Spend Record Sum

American chemical producers plan to spend a record $853 million on new plant and equipment in the last half of this year. That would be 32 per cent more than they spent in the first six months. If plans are carried out, the Commerce department says, the outlay of chemical makers for the year would run to $1.5 billion, 48 per cent more than in 1955. The total also would be 5 per cent above the previous peak in 1953. Capital spending for all manufacturing industries is expected to run 33 per cent higher than it did a year ago.

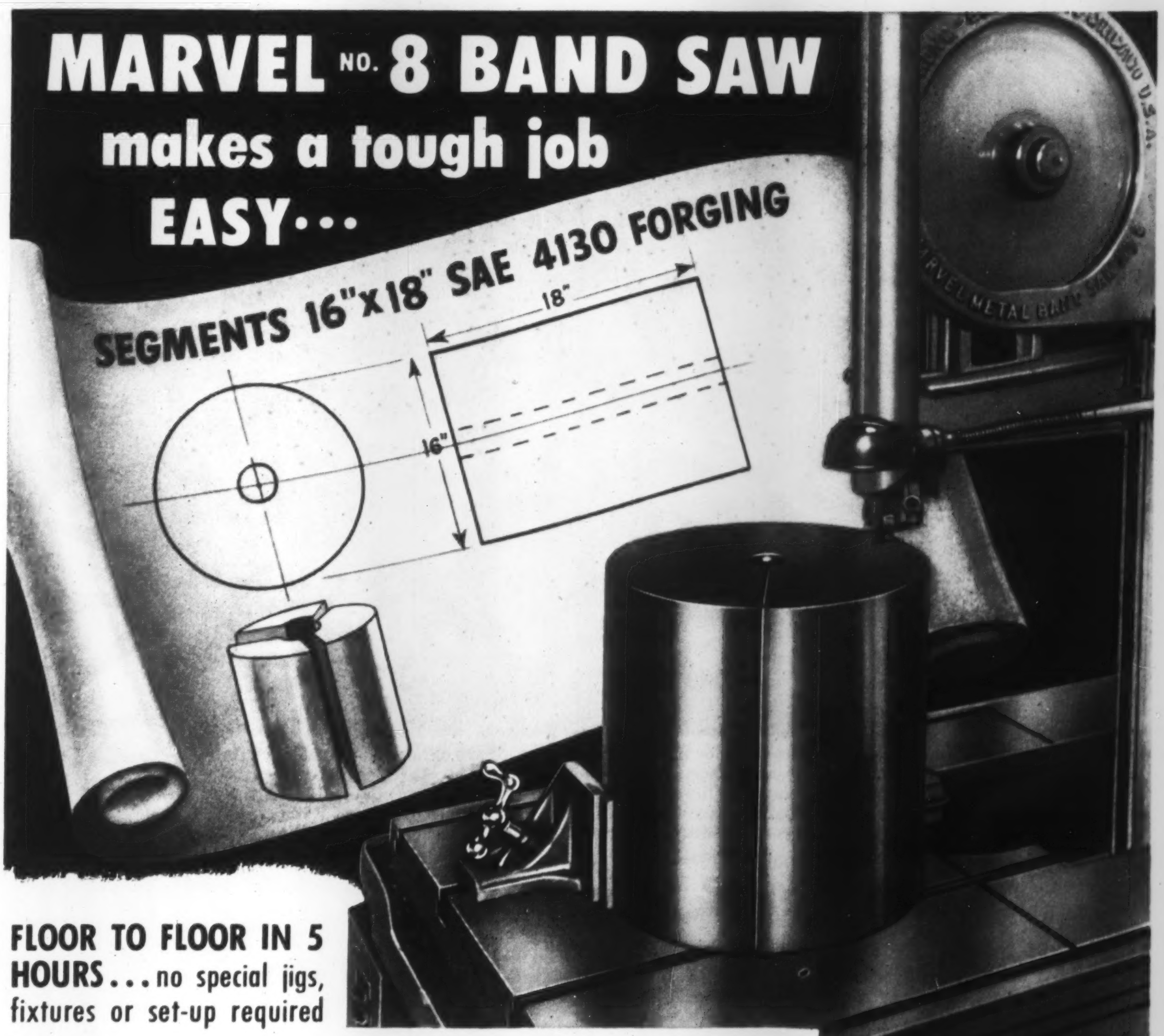
## Bigger Splash from Outboards

Interested in a steadily growing industry? Consider the outboard motor business. Sales have gained steadily ever since 1951 when 291,697 units were marketed, compared with 600,000 expected to be sold this year. With only between 4 million and 5 million outboards in use, saturation of the market is not in sight.

## Straws in the Wind

An immediate market for more than 250,000 central air conditioning systems exists among home owners in metropolitan areas, Du Pont figures . . . American shipbuilding backlogs for the first time since November, 1953, now exceed 1 million dead weight tons . . . Fried. Krupp A.G. expects to negotiate several more agreements with U.S. firms similar to the one just signed with Blaw-Knox Co. It calls for Blaw-Knox to provide technical data and assistance in the construction of rolling mills in exchange for royalties from Krupp . . . Another type of Supplemental Unemployment Benefit has been negotiated in metalworking—this one with Goodyear Aircraft Corp., Akron; it's basically the auto type but provides lump-sum or rotating payments to get around Ohio laws which prohibit a worker from collecting state and private benefits at the same time.

# MARVEL No. 8 BAND SAW makes a tough job EASY...

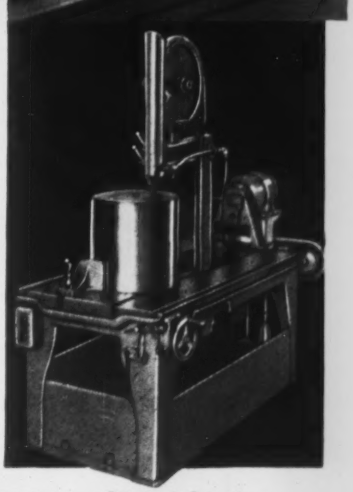


**FLOOR TO FLOOR IN 5 HOURS... no special jigs, fixtures or set-up required**

The versatility, simplicity of operation and unmatched efficiency of a MARVEL No. 8 Universal Metal Cutting Band Saw makes it the best all-around saw you can buy.

Take the job illustrated, as an example. Three equally spaced re-entrant cuts were required to segment a large, heavy die forging. The work was merely placed on the table between the vise jaws with the first lay-out line positioned to bisect the blade. Feed pressure was set on the direct-reading scale and the cut started. On a MARVEL No. 8, the work is always stationary and the blade is fed into the work; the cutting edge of the blade is always square with the table throughout its full feed traverse, which eliminates the need for special fixtures. The pre-set Automatic Overload-Relief Power Feed kept the blade moving into the work only as fast as it could freely remove the metal; as the vertical length of the cut decreased, the blade was automatically fed faster, thus increasing cutting speed. Upon completion of a cut, the blade was rapidly returned to its starting position by a rapid traverse handwheel located at the operator's position. Succeeding cuts were made in the same manner, with the same ease and speed.

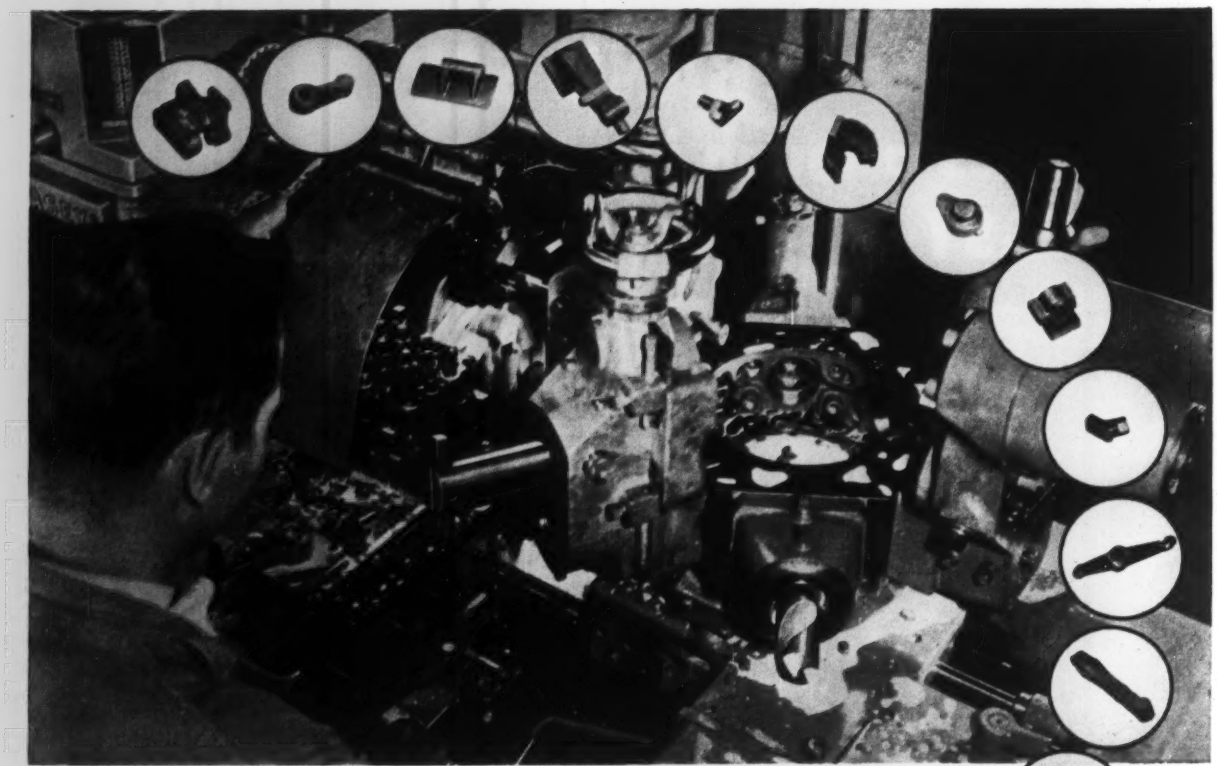
Jobs like this aren't done every day, but they serve to emphasize the versatility of the MARVEL No. 8, a truly universal metal cutting saw. If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.



**ARMSTRONG-BLUM MFG. CO.**
5700 BLOOMINGDALE AVE. · CHICAGO 39, ILL.

MARVEL *Metal Cutting* SAWS
Better Machines-Better Blades

S-1302



**An 80% machining advantage**...as well as superior mechanical properties are obtained by the switch to ductile iron castings for this turret lathe and other machine tools produced by The Warner & Swasey Company, 5701 Carnegie Avenue, Cleveland 3, Ohio. Shown above are typical parts now cast in ductile iron to cut both production and maintenance costs. Combining the best features of cast iron and steel, ductile iron is easy to cast and machine, yet provides high strength and toughness.

# *Warner & Swasey* improves 275 turret lathe parts with ductile iron

Clutch plates, hinges, levers, tool holders, wrenches . . . 275 parts in all . . . are now specified in ductile iron for Warner & Swasey turret lathes.

**MONEY-SAVING MACHINABILITY** was one reason for Warner & Swasey's adoption of ductile iron. The machine shop reports an 80% advantage in machining operations for ductile iron castings over the malleable iron parts they replaced. The ductile iron castings cut readily and evenly at hardness levels of 170-190 BHN. This means worthwhile savings in machining costs, but there are other advantages, too.

**HIGH MECHANICAL PROPERTIES**

Ductile iron castings provide a combination of strength, hardness and toughness that makes them dependable for severe use in machine tools. Specifying ductile iron type 60-45-10, Warner & Swasey finds the castings provide an average yield strength of 56,250 psi and elongation of 16%. These parts also have a high level of wear resistance.

**AND CASTABILITY**

The good fluidity of ductile iron permits filling intricate molds . . . improving quality of the castings and quantity of output regardless of wide variations in section thickness.

You, too, can cut machining costs and improve your products or equipment by using ductile iron castings. Get all the facts in "DUCTILE IRON, The Cast Iron THAT CAN BE BENT." Write for your copy now.

**ductile iron . . . the cast iron that can be twisted and bent**

**The INTERNATIONAL NICKEL COMPANY, Inc.**
67 Wall Street, New York 5, N. Y.

November 5, 1956

# Building America

Construction is heading toward a succession of records. They will be erected atop the foundation of ten postwar records.

Starting with a volume of $5 billion in 1945 as the cornerstone, new construction this year will show a ninefold increase. The new figure, nearly $45 billion, is bigger than the Gross National Product was at the beginning of World War I. Next year's record promises to be at least 5 per cent higher. Within a decade (see page 65), we will approach $60 billion annually in terms of constant dollars. America is building anew.

High postwar building activity has been a key factor in the boom of the past decade. It will be equally important in the next.

We can't have a first-class boom without brisk construction activity. Conversely, we can't go into an economic tail spin when building is brisk. That was demonstrated in 1954 when many feared the post-Korean adjustment would drag us into a serious recession. Construction kept going up, set a new high and is credited with keeping the economic ills of that year mild.

Construction goes hand in hand with the metal producing and the metalworking industries. Building is a top customer for steel, aluminum, copper and many metalworking products. Expansion programs of metal industries are supplying a substantial portion of the increased construction volume. Industrial construction in 1957 is expected to be 10 per cent higher than it was in 1956. It will continue to mount over the next several years.

Other construction demands—for highways, schools and hospitals, sewers and water lines, conservation—are too pressing to be denied.

The biggest problem of the construction industry, currently and in prospect, is the shortage of construction steel. Demand for structural shapes, plates and reinforcing steel grows faster than the industry's capacity to supply it. Competitive materials are readily available.

Will steel lose ground as a construction material through unavailability?

The problem worries steel producers, fabricators and contractors as we face the prospect of a continuing expansion in construction. Many are asking if we should accelerate our expansion to produce construction steels and help build a bigger America.

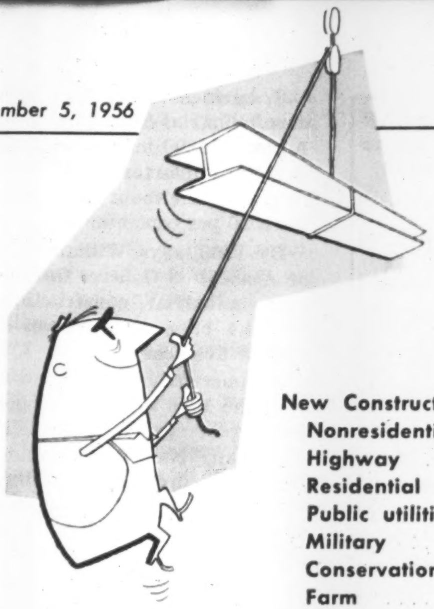
Walter J Campbell

EDITOR

## WHEN MIGHTHOOD WAS IN FLOWER

From the time of the Pyramids until just recently, heavy construction required "gangs" of men. Today, giant machines supply most of the muscle. In our lifetime, an aggressive construction industry has astounded the nation with its everyday miracles. Steel has played its part by developing better-forming, higher strength steels that have resulted in roads, bridges and buildings that last longer, look better and perform more efficiently. These same steels have also helped make possible the modern tools that dig and pound, lift and haul. An important job at Inland is supplying the *right* steels for building and for the tools of building.

**INLAND STEEL COMPANY** *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the construction industry include plates, structural shapes, 4-Way safety plate, piling, Ti-Co galvanized sheets, Hi-Bond reinforcing bars, sub-purlins. Other products: hot and cold rolled sheets and strip, tin mill products, rail and track accessories, coal chemicals.*



## Coming: A Record Decade for Construction

(Work put in place in millions of current dollars)

| | 1956 | 1957 | 1965 | 1956-1965 % Increase |
|---|---|---|---|---|
| **New Construction** | 44,500 | 46,647 | 58,287 | 31 |
| **Nonresidential building** | 12,775 | 13,255 | 17,100 | 34 |
| **Highway** | 5,150 | 6,800 | 8,200 | 59 |
| **Residential** | 15,775 | 15,706 | 19,895 | 26 |
| **Public utilities** | 5,600 | 5,650 | 6,365 | 14 |
| **Military** | 1,400 | 1,100 | 550 | -61 |
| **Conservation** | 675 | 816 | 1,592 | 136 |
| **Farm** | 1,500 | 1,500 | 1,575 | 5 |
| **Sewer and water** | 1,300 | 1,480 | 2,550 | 96 |
| **All other new** | 325 | 340 | 460 | 42 |
| **Maintenance and repair** | 15,500 | 15,900 | 19,350 | 25 |
| **Total** | 60,000 | 62,547 | 77,637 | 29 |

Source of estimates: Associated General Contractors of America Inc.

# Construction Sets the Pace

## New building may hit the $48-billion mark in 1957, 7 per cent above 1956's record. Tight money and tighter supplies of structurals are trouble spots

MANY ECONOMISTS are already crystal balling 1957 as the best year yet for U.S. business. One good reason for that forecast: The construction industry is headed for another record year.

**Comparison**—"It will take a hell of a jolt to slow down construction," comments one Washington source. By the same token, the economy as a whole appears to be in fine shape as long as the industry maintains its record-breaking pace.

In 1946, construction (including maintenance and repair) amounted to 10 per cent of the Gross National Product. By 1951, it was over 13 per cent. Today, it is almost 15 per cent. Significantly, the industry kept rolling at an increasing rate right through the two postwar adjustment years (1949 and 1954).

A conservative ten-year projection of the industry's dollar volume by Associated General Contractors of America Inc. (see table above) gives new construction a $520-billion decade ahead, compared with a volume of $320 billion from 1946 through 1955.

**Big Items**—High on the list of catalysts which could spark the U. S. economy to new heights next year: The federal highway program (STEEL, Oct. 29, p. 79), industrial expansion (STEEL, Sept. 17, p. 134), President Eisenhower's public school program and the vital need for increased sewer and water facilities.

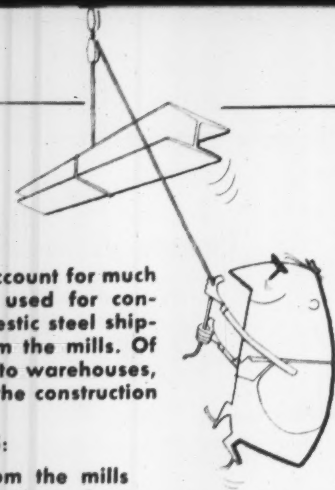
Here are the high and low estimates for dollar volume of new construction to be put in place in 1957: $45 billion on the low side (from an F. W. Dodge Corp. survey of economists); $48 billion on the high side (says Walter W. Schneider, construction statistics chief, Business & Defense Services Administration).

The middle road appears to be about $47 billion. That would be a 5 per cent boost over 1956's $44.5 billion. (When this year's final returns are in, it could run as high as $45 billion.) But the $48-billion figure is possible if housing holds to 1.1 million starts, if the road program picks up speed quickly and if businessmen generally remain confident.

**Money Problems**—Much of the increased GNP next year will be caused by inflation, believe the experts surveyed by F. W. Dodge. Within the construction industry, says Mr. Schneider, inflation could account for an increase of "a few percentage points."

An increase in physical volume of work put in place is needed to push construction toward the $48-billion mark. But the government's efforts to control inflation don't necessarily work to the industry's advantage.

Besides housing, tight money will bear on construction in general, says a Washington economist: "Construction creates tremendous



## Steel for Building

**Plates, shapes, bars and piling account for much of the 12.1 million tons of steel used for construction. Some 12 per cent of domestic steel shipments go direct to construction from the mills. Of the 15.8 million tons of steel going to warehouses, about 15 per cent finds its way to the construction industry.**

**Construction's total take in 1955:**

**9.7 million tons from the mills**
**2.4 million tons from warehouses**
**———**
**12.1 million tons**

## Construction's Steel Shopping List

| | U.S. Capacity (Net tons) |
|---|---|
| Heavy structural shapes | 6,232,224 |
| Rolled steel piling | 323,000 |
| Sheared plates | 7,446,326 |
| Concrete reinforcement bars | 2,427,872 |

strains on the national credit picture. If the government's tight money policy continues and public demand for credit in such areas as automobiles is heavy, construction volume could be held back."

**Housing Story**—Doom predictors are putting next year's new housing starts at only 800,000. But you can probably discount that as just ammunition for those seeking easier credit policies. Albert M. Cole, housing and home finance administrator, holds to the outlook for 1.1 million starts in 1957, while the National Association of Home Builders counts 1 million as the minimum.

So far, homebuilders feel the administration has done little to help housing—look for the new Congress to raise interest rates on GI loans next spring.

Easier credit could push housing starts to 1.2 millon. Mr. Schneider says the increase in savings this year could mean more mortgage money next year. Other factors favorable to housing: The 1956 Housing Act may stimulate co-operative, military and public housing; urban redevelopment programs are in full swing in several major cities now. Watch for further tightening of building codes (and their enforcement), so cities can qualify for public aid.

**Survey** — The NAHB's annual survey of housing prospects for the year ahead shows builders themselves expect starts to be down 10 per cent from 1956's 1.1 million. Significantly, the builders think starts could go up 6 per cent if the money situation eased a little. Over 50 per cent of the builders said the shortage of mortgage money was the major factor in their outlook for 1957.

Next year, builders will be turning out houses at the median price of $15,250, compared with $14,700 in 1956 and $13,500 in 1955. This squares with rising construction costs as well as the trend to bigger homes. (The American family wants a bigger house, and the builder prefers to build it because of better profit margins.)

Housing appears to be the only soft spot in construction, with the possible exception of farm building. The outlook for it: No increase above the $1.5 billion to be spent this year.

**Industrial**—Through September, U.S. business spent $2.3 billion on new industrial construction in 1956. A record $800 million was spent in the third quarter, and the year's total will run about $3 billion. Look for a 10 per cent hike next year.

By 1960, says William G. Dooly of Associated General Contractors, new industrial construction will hit $4.4 billion, then level off for four or five years.

Commercial building also should pass the 1956 mark by 10 per cent next year, says Melvin H. Baker, chairman, National Gypsum Co. Besides record office building and warehouse construction, watch new suburban shopping centers go up at record rates.

Among other private nonresidential categories, church building is a pace setter. More churches were built in September than in any other month in history.

Expansion of private public utilities will continue, too. Dollar volume of new construction should hit $5.5 billion next year, compared with $5 billion this year, $4.6 billion last year.

**Highways** — Associated General Contractors estimates the dollar volume of highway construction at $8 billion by 1960, while other sources think it will be closer to $9 billion. Estimates for 1957 range from $6.4 billion to $6.8 billion.

The federal program is designed to get into gear next year. How fast states pick up their shares of the program will be the deciding factor.

There's really no end in sight for spending on highways. The AGC feels that by 1965 we'll still only have 80 per cent of the highways needed even if the federal program stays on schedule.

**Conservation** — Another area where it's hard to see an end to expansion: Reclamation projects like the upper Colorado river project, the St. Lawrence Seaway, the Mississippi river system and the many plans on the drawing boards of the Army Corps of Engineers. Expenditures for conservation could more than double in the next decade if Congress decides to go ahead.

Finally, the nation's need for better sewer and water facilities is tremendous: $14 billion is needed in the next 20 years, says the Department of Commerce, to increase facilities, and another $8 billion is needed to offset obsolescence.

**Materials**—In 1955, about 12 million tons of steel products went into construction (see table). There's no way to estimate exactly how increased construction expenditures will affect steel consumption over the next decade, but it's safe to say the industry will continue to rank with the auto industry as one of steel's most important customers. Demand for steel products by the construction industry is probably at an all-time high, with structurals predicted to be in short supply through most of next year.

## Bruning Builds

Charles Bruning Co. Inc., Chicago, is building a $3-million manufacturing plant and office building at Mt. Prospect, Ill. The company makes reproduction machines and sensitized papers.

The 307,100 sq ft facility has more than twice the space of the company's two Chicago plants it will replace.

## Steel Expansion at Buffalo

Colorado Fuel & Iron Corp., Denver, is preparing to expand its Wickwire Steel division property in Buffalo. The river-front portion of a 175-acre tract is being filled in with slag.

Long range plans are said to include the doubling of the Wickwire plant.

## General Machine Starts Plant

A 60,000 sq-ft structure is being built for General Machine Products Co., Philadelphia, in Bensalem township. The plant will be used for the manufacture of precision industrial components and special machinery for the electrical, electronic and communication industries.

## Textron Division Adds Plant

A multimillion dollar facility for the production of radar antennas has been opened at Belmont, Calif., by Dalmo Victor Co., a division of Textron Inc., Providence, R. I. The plant contains 200,000 sq ft.

# Structural Steel: Up, Up, Up

**Bookings for the last 12 months rose 45 per cent over those of the previous period. Fabricators have no fear that tight credit or other economic problems will dim outlook**

STRUCTURAL steel fabricators are riding the crest of the construction boom and see nothing but continued high activity ahead.

That was the consensus of members of the American Institute of Steel Construction, meeting at the Greenbrier, White Sulphur Springs, W. Va., Oct. 27-Nov. 1.

**Volume High**—Bookings for fabricated structural steel for the last 12 months amounted to 4,220,000 tons, a 45 per cent increase over the preceding period and an easy record.

The outlook for 1957 and the decade ahead is for continued high activity. Fabricators holding backlogs which extend well into next year have no fear that credit restrictions or other economic conditions will materially dim their outlook.

**N. P. HAYES**

*. . . heads AISC and Carolina Steel & Iron*

**Prospects**—Says L. Abbett Post, executive vice president: "The new 40,000-mile interstate highway system will guarantee a heavy demand for structural steel bridges for the next 13 years. A wide variety of other types of construction will be generated by this program—such as industrial development, shopping centers and even whole new communities. The long range outlook for structural steel fabricators is most encouraging."

Their No. 1 problem is a shortage of steel from the mills, especially shapes and plates. While shipments of plain material in the last 12 months totaled 3,290,000 tons, a volume that normally would be high, it was inadequate to fill the heavy demand.

**Prosperity** — The shortage will continue into 1957, warns David F. Austin, executive vice president-commercial, United States Steel Corp. Mr. Austin says producers of shapes and plates are expanding their capacities for those products, but that demand continues to outrun supply. His own company, says Mr. Austin, has increased capacity to produce wide flange beams by 107 per cent in the last ten years. But the supply is still short. "Prosperity," says Mr. Austin, "is our biggest problem."

## Sylvania Builds Pilot Plant

Sylvania Electric Products Inc. started construction on an engineering and pilot production building at Towanda, Pa., for its Tungsten & Chemical Division.

The building, to be completed by the middle of next year, will house the division's expanding activities in semiconductors, phosphors, chemicals and metallurgy.

## Chemicals in Louisiana

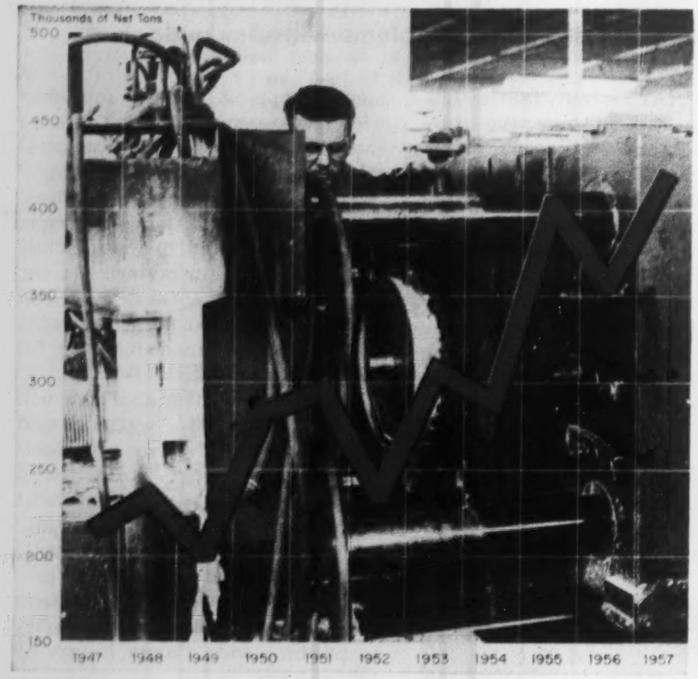
Dow Chemical Co., Midland, Mich., expects to invest more than $50 million in its Louisiana Division at Plaquemine, La.

Preliminary plans made in February put the figure at $20 million. Construction employment, to start soon, is expected to reach 1500 at the peak of the building program.

The division will produce caustic soda, chlorine, glycols and oxides of ethylene and propylene, and other products.

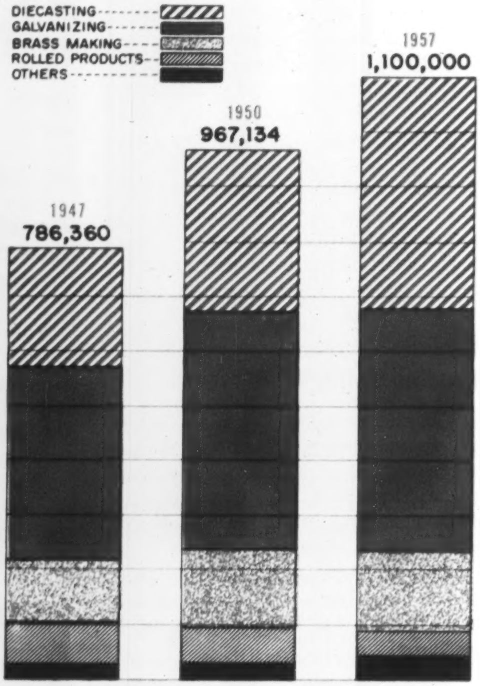
# Zinc Consumption: Ten-Year Picture

## Diecasting Grows Fast



American Zinc Institute

## Other Markets Grow, Too



# Zinc Consumption Climbs

### Demand from diecasters and galvanizers, also from brassmakers, helps shape zinc producers' optimism. But oversupply may cause problems if stockpiling is cut back

ZINC MEN are confident. Consumption of their product will be below last year's mark (a record 1,078,968 tons), but the industry expects that some 994,900 tons will be used this year.

Fourth-quarter sales will increase week by week as 1957 automotive production gets going. November and December should be peak sales months. Outlook for 1957: Some 1.1 million tons will be consumed by American metalworking (see chart).

**1956**—A steel strike and reduced automotive production account for the dip in sales of slab zinc this year as the industry's two largest customers—diecasters and galvanizers—cut back orders. But estimates are optimistic.

Points out Howard I. Young, president, American Zinc, Lead & Smelting Co.: "U.S. per capita consumption of zinc in all forms reached an all-time peak (13.1 lb) in 1955. This represents an increase of 24 per cent over the 1947-1949 average. It is reasonable to expect this figure to increase 3 to 4 per cent a year."

**Users**—The American Diecasting Institute (ADCI) reports: "This year's zinc diecasting shipments appear headed for a 355,000-ton total. While this is a 13 per cent drop from 1955 results, only a solid 15 per cent gain in nonautomotive applications by job shop producers made this result possible. Automotive shipments (by job shop producers) dropped 32 per cent."

ADCI predicts that more zinc diecastings will be going into 1957 model automobiles. Average increase: 8 per cent over 1956 models. If 6.5 million cars are produced in 1957, demand will be about 40,000 tons above 1956 totals. Nonautomotive applications may call for an additional 24,000 tons, predicts the institute. Some growing nonautomotive markets: Home appliances, industrial machines and tools, commercial equipment, builders' hardware, office and business machines.

**Galvanizing**—Reports one industry observer: "The market for new type galvanized materials is growing. Production of steel-base galvanized products will be about 2,750,000 tons this year."

C. T. Jewell, assistant general superintendent of galvanizing, Wheeling Steel Corp., explains:

"Because of new types of continuous galvanizing methods which make the zinc coating at least as ductile as the steel base to which it is applied, we believe that many new fields will be opened for the use of galvanized products."

A few of the important end uses: 1. General heating, ventilating and air conditioning duct work. 2. Culverts. 3. Drainage pipe for general road construction. 4. Roofing, siding and galvanized steel buildings. 5. TV masts, washing machine parts and various kinds of formed containers.

**Brass Mills**—The third most important users — brassmakers—are tied closely to motordom. The expected good 1957 model year should keep brass mills ordering at about 1955 levels.

**Stockpile**—The price level being maintained by the domestic zinc industry (13.50 cents per pound) has been given a substantial assist from the government's stockpile program. Since July, 1954, purchases for stockpile have taken up most of the excess zinc on the market. By the end of this year, the government will reach its 300,000-ton goal. In addition, the U.S. has been conducting a barter program sponsored by the Agriculture department, trading foodstuffs to foreign countries for excess lead and zinc.

**Future?** — What will happen when the U.S. reaches its stockpile goal is causing mixed comment. Some contend that the domestic program will be dropped by the end of this year but that the U.S. will continue its barter program. This would help keep excess world market zinc from flooding into the U.S. Others feel it will be impossible for either political party to stop either program.

**Summary**—While the future of stockpiling is being debated, five major producers of zinc surveyed by STEEL agree with J. L. Kimberley, executive secretary, American Zinc Institute, who reports: "The minor market losses incurred this year, when compared with 1955 results, will be more than made up in 1957. And, remember, 1956 will still be the second best year for zinc consumption in the U.S. Next year will equal or slightly exceed 1955, the record year."

# Where Aluminum Goes

## Here's a glance-level picture of where wrought aluminum (mill products) is being shipped. Big uses are in consumer durables, building materials and transportation

LATEST trends in wrought aluminum shipments are revealed by the Aluminum Association, New York.

Three civilian markets — consumer durable goods, building materials and transportation equipment—took 49.4 per cent of total shipments in the first six months of 1956 (see table).

**Trends** — Association Secretary Donald M. White says that increased shipments for consumer durables offset modest decreases in the other two leading markets. Indications are that more aluminum was used for products like household appliances, furniture and lighting fixtures.

Parenthetically, the Kelvinator Division of American Motors Corp., Detroit, estimates that the aluminum content of its household refrigerators has increased at least 50 per cent in the last four years.

The metal furniture market has jumped from $50 million to $180 million a year in the last decade. Aluminum summer furniture accounts for some 60 per cent of this total.

**Comparisons** — The volume of shipments, notes Mr. White, is slightly above that in the last half of 1955 (823,695 as against 718,658 net tons). Building materials, he said, accounted for 19 per cent of this total, compared with 20.2 per cent in the preceding six months. Shipments for transportation equipment amounted to 17.4, compared with 17.5 per cent.

## Analyzing Aluminum Shipments

| | Per cent of total shipments for six-month periods ended: | | | |
|---|---|---|---|---|
| | June 30, 1956 | Dec. 31, 1955 | June 30, 1955 | Dec. 31, 1954 |
| **Building materials** | 19.0 | 20.2 | 19.2 | 20.3 |
| **Consumer durable goods** | 13.0 | 11.6 | 13.3 | 11.5 |
| **Transportation** | 17.4 | 17.5 | 16.6 | 16.9 |
| **Electrical** | 7.8 | 7.7 | 7.6 | 8.3 |
| **Machinery & equipment, commercial & industrial, except electrical** | 6.2 | 4.7 | 6.5 | 4.1 |
| **Packaging & containers** | 4.4 | 5.0 | 4.9 | 5.7 |
| **Shipments for conversion into primary wrought products** | 9.7 | 9.8 | 8.5 | 9.9 |
| **Distributors and jobbers** | 16.7 | 15.3 | 14.5 | 13.5 |
| **Other*** | 5.8 | 8.2 | 8.9 | 9.8 |
| **TOTAL** | 100.0% | 100.0% | 100.0% | 100.0% |

*Includes exports, military shipments and miscellaneous uses

Source: Aluminum Association

# Scrap Machines: New Look

## Georgia open house draws big crowd to see '57 model scrapyard machines. Interest centers on a new auto baler and a large hydraulic shear

SOME 250 metalworking executives from all parts of the country recently gathered in Cordele, Ga., to see a baling press that squeezes automobiles into neat cubes at a rate of 30 tons an hour and a shear (illustrated) which will handle 4½-in. round or 1-in. mild steel plate.

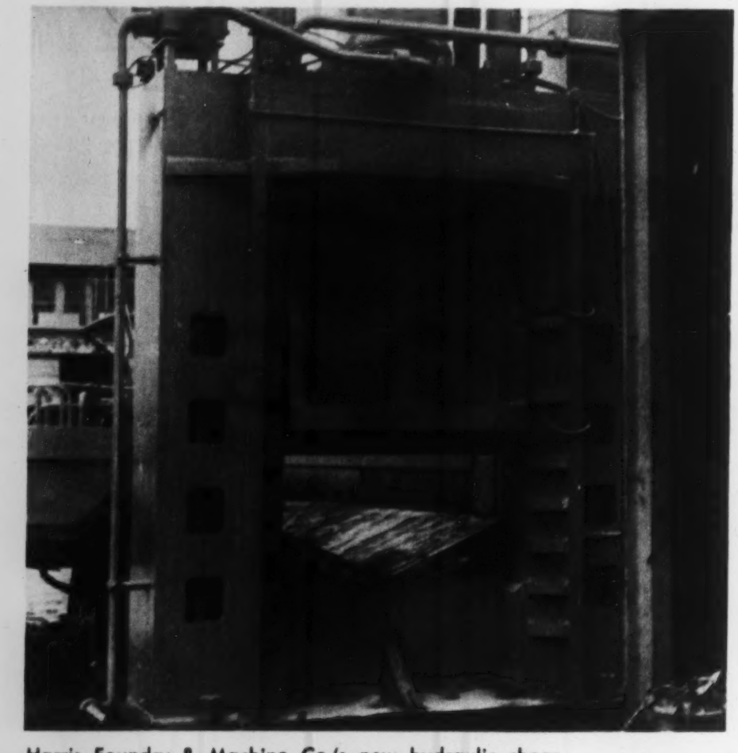
The new machinery was shown by Harris Foundry & Machine Co.

**Focus**—The shear, a first for the scrap industry, drew a lot of interest. In a morning demonstration, it cut two charges—7500 lb of scrap—in 7 minutes. Charges included auto frames, line shafts, pulleys, pieces of I-beam and miscellaneous scrap.

The shear's charging box takes material up to 18 ft long and 5 ft wide. The blade, which shears at up to 500 tons of pressure, makes a cut every 12 seconds. Cut length is preselected. The machine was of special interest to dealers from the larger yards, which process large quantities of No. 1 and No. 2 scrap. Big savings in labor and other torch cutting costs are possible.

**Big Squeeze**—The new baler has a charging box which is 18 ft long. It exerts a final compression force of 707 tons. Its electric motors will put out a peak of 480 hp.

The baler itself weighs 187 tons. It will turn out finished bales of scrap weighing from 800 to 2400 lb. Its price, f.o.b. Cordele, is $225,000.



Harris Foundry & Machine Co.'s new hydraulic shear

### Crucible Buys Vacuum Metals

Complete ownership of Vacuum Metals Corp., Cambridge, Mass., has been acquired by Crucible Steel Co., Pittsburgh. National Research Corp., Newton Highlands, Mass., organized Vacuum Metals in 1946. It sold a half-interest to Crucible in 1954.

Vacuum Metals, a producer of vacuum cast metals and alloys, will be operated as a wholly owned division of Crucible.

# Knowledge Pays Off

## An AMA study shows engineers and scientists are earning 8.6 per cent more this year

SALARY increases of engineers and other professional personnel this year have averaged almost twice the size of those granted last year, reports the American Management Association. This income group is earning 8.6 per cent more than it did in 1955. From 1954 to 1955, its rate of increase was 4.5 per cent.

**Engineers Gain**—The percentage rise in the salaries of engineers in the last year is higher than that shown for other executive and special groups studied by the AMA. Engineers with less than one year's experience are earning a median salary of $5300 a year. Those with one to three years of experience have a median of $6500.

Highest salaries reported are paid to research specialists who also have some administrative duties. Some go as high as $19,000 a year. Physicists and mathematicians with administrative duties are making about $15,000.

**Overlap** — Professional salaries tend to overlap with those of middle management, but total earnings are usually less for the professionals because they are less likely to receive bonuses. Half the middle management men covered by another AMA study received bonuses, while less than a fourth of the professionals did.

This survey covered 31,400 professional men employed in 49 different activities at five levels of responsibility.

### Western Construction Booms

Construction in the 11 western states has already passed the record dollar volume put in place in

1955 (about $4 billion). Rate of gain in 1956 has been about $50 million a week.

### Republic Line-Up Described

The meaning of the new executive line-up at Republic Steel Corp. became clearer last week when the two principals, C. M. White and T. F. Patton, spoke before the Cleveland Advertising Club. STEEL announced on Aug. 27 (page 50) that Mr. White had been named chairman, succeeding T. M. Girdler, who retired, and that Mr. Patton had moved up to the presidency. Mr. White continues as chief executive officer.

Republic does not have an organizational chart. In its place is a "policy of individual responsibility under which our top management teams function far better than if their areas of activity were precisely defined," reported Mr. White.

Top management reports directly to the policy committee. The overlap of interests and responsibilities among departments "is what we want," said Mr. White, "because we believe that by such means deviations from our policies are most quickly detected and corrected."

Mr. White directs the policy group, while Mr. Patton heads up operations.

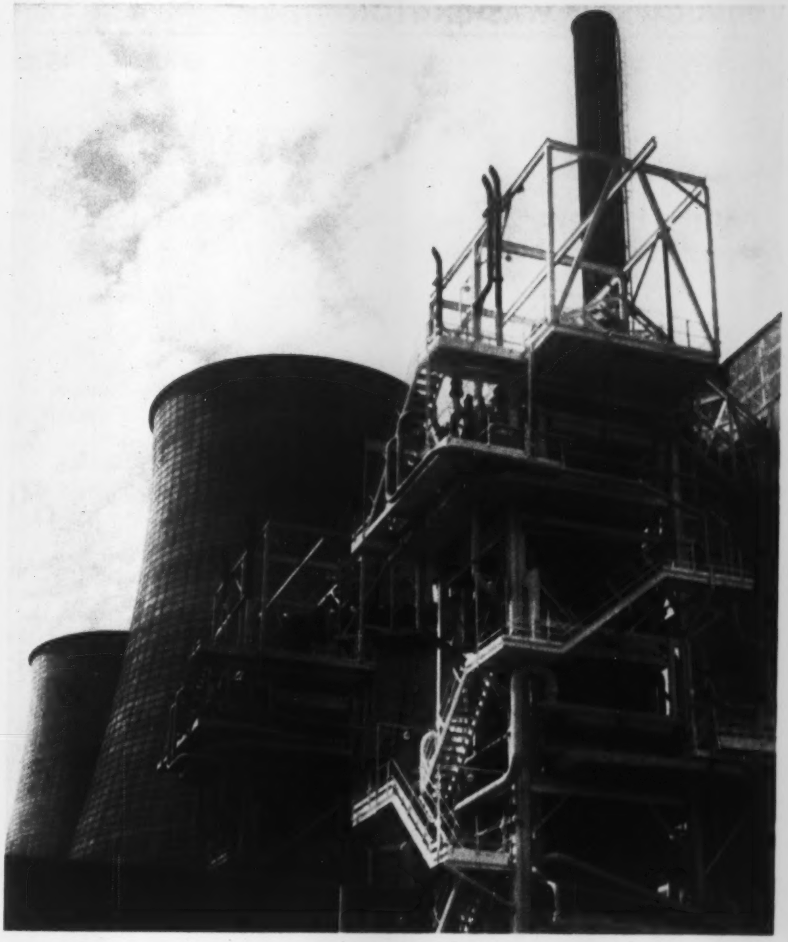
The latter made this prediction: "Ohio may reach first place this year in consumption of steel." Michigan has been the leader.

### Coming: Gear Classification

The big news coming out of last week's semiannual meeting of the American Gear Manufacturers' Association in Chicago: A system of classifying gears by accuracy will be developed.

Gunnar E. Gunderson, who is president of AGMA and Brad Foote Gear Works Inc., Chicago, emphasized the need for such a system. It would be a helpful guide for manufacturers and users, he noted.

A newly appointed task force agreed on a program. Its first step will be to translate a German publication which describes a system that divides gears into 12 grades.



Cooling towers for Calder Hall atomic power plant, England

# Steelmaking Goes Atomic

WORKINGTON Iron & Steel Co., Cumberland, England.

An unfamiliar name to American readers? Yes, but it will be remembered as the first steel mill in the world to be run with atomic power.

**Centennial**—Now a division of United Steel Companies Ltd., Sheffield, England, the company was founded 100 years ago as the Workington Hematite Iron Co., It still uses the original acid bessemer steelmaking technique, which also dates back 100 years.

The plant is 18 miles from Calder Hall, where last month Queen Elizabeth pulled a switch to turn on Britain's—and the world's—first full-scale civilian atomic power generating plant. The electricity produced helps drive 2500 and 2750-hp motors at Workington's rail mill.

**Start-Up**—The station is operating at one-eighth of its capacity of 80 megawatts (80,000 kilowatts), which will be reached in the near future, when a second atomic reactor is completed.

More plants of the same type are to be built. Another is going up on the Calder Hall site. By 1965, the United Kingdom will be producing between 3000 and 4000 megawatts of atomic electricity. By 1975, the program is expected to save up to 70 million tons of coal a year. Calder Hall electricity is being produced at a cost which is not much higher than that of a modern coal-fired plant.

## Antitrust Noose Doesn't Worry Labor

DON'T GET excited if several bills aimed at bringing labor unions under antitrust laws are introduced in Congress next year. Unions aren't: They regard them as "just one of those things." And management groups in Washington aren't optimistic. Consensus is that the chances for enactment of such legislation are mighty slim in a period of comparative labor peace. But a few Congressmen have indicated they will introduce bills on the subject.

## Justice Puts Out Feelers

The next few months could be a feeling out period. When the Justice department was asked if its attitude is the same as was expressed about two years ago by the attorney general's national committee to study the antitrust laws, the only answer was: "No comment." That committee passed off the issue as beyond the scope of its study, but did comment: "To the extent that commercial restraints which are not effectively curbed by the antitrust or labor-management relations acts exist, we recommend appropriate legislation to prohibit these union efforts at outright market control." Mentioned were union actions aimed at directly fixing the kind or amount of products which may be used, produced or sold, or the number of firms which may engage in their production or distribution. But if Justice has any "appropriate legislation" in mind or if it thinks there is a need for it, the matter is being kept well under wraps. Nearness of the election is the most probable reason for "no comment."

## New Look at Corporate Taxes

The Internal Revenue Service has its sights on a loophole in the 1954 tax law revisions. Originally a wartime incentive to get plants to put in new equipment, it allows firms to claim full credit for depreciated assets if they are sold at a loss. If a profit were realized, it would be taxed at only the capital gains rate rather than as income. That could be one of the items to come up in about two weeks when the House Internal Revenue Subcommittee headed by Rep. W. D. Mills (Dem., Ark.) begins hearings aimed at correcting technical and clerical errors in the 1954 code. Another look at taxes gets under way Nov. 26 when the House subcommittee on excise taxes begins hearings. From those could result recommendations for changes in rates and excise tax policy.

## Defense Department: Juggler

Watch for a bigger slice of fiscal 1958's Defense department budget to be earmarked for research and development. The dollar figure could be two to three times this year's $1.6 billion, but only part of that will be a net increase. The rest will be merely number juggling, transferring some projects from present listings hidden among construction, procurement, military pay and other funds. The shift could make an apparent dent in procurement figures, but. again, only as a result of juggling.

## Tight Money Under Fire

A look at current tight money policies of the Federal Reserve Board will be taken Dec. 11 by the Subcommittee on Economic Stabilization. Star witnesses will be William McChesney Martin Jr., chairman of FRB's board of governors, and Alfred Hayes, president, New York Federal Reserve Bank and vice chairman of FRB's open market committee. Chairman of the subcommittee is Rep. Wright Patman (Dem., Tex.).

## Defense Readiness Check

The Business & Defense Services Administration is embarked on a rash of meetings with industry advisory committees. At meetings so far this fall, emphasis has been on developing information for BDSA on mobilization capabilities of various metalworking equipment and component industries. Similar data will probably be asked from industries scheduled to come to Washington in coming weeks. On the list: Oil field machinery and equipment, construction machinery and electronic components.

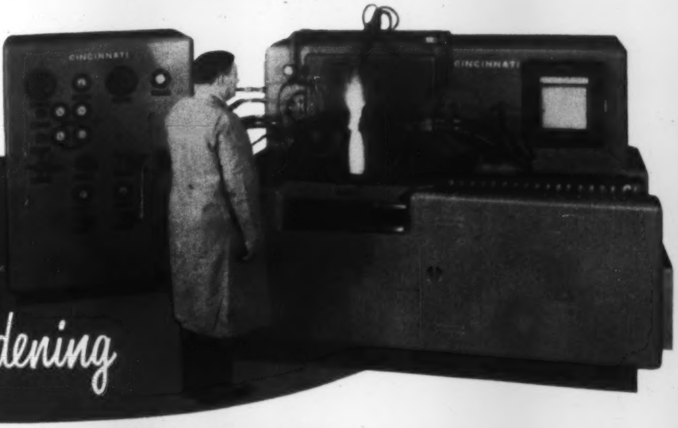
## Merchant Ship Reactor

The contract to build the reactor for the first U.S. nuclear merchant ship will go to Babcock & Wilcox Co. The proposal calls for the design, building and testing of a pressurized water reactor system.

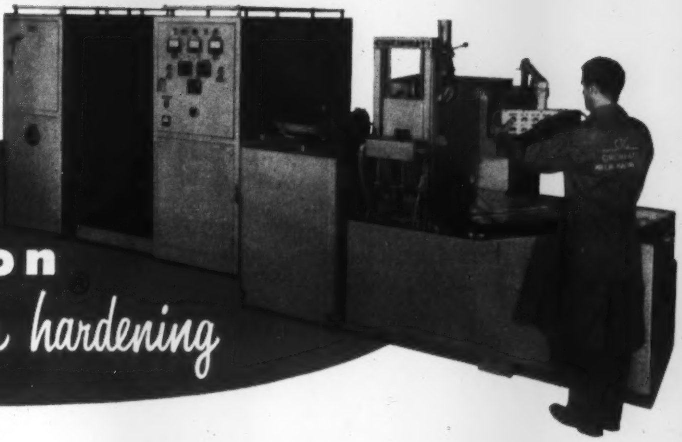
## Washington Whispers

More than 400 small business firms are working on the atomic power plant at Shippingport, Pa. It will be our first large scale atomic plant to make power exclusively for civilian use . . . The combining of Air Force and Navy orders for sidewinder missile components is helping to hold down costs. Philco Corp. and General Electric Co. have $14-million and $17-million contracts for the production of guidance and control units . . . Bath Iron Works, Bath, Me., will build two guided missile frigates. Price is $40.5 million for the pair.

# Here's selective heat treating that can be Made-To-Your-Measure!



**flamatic** *flame hardening*

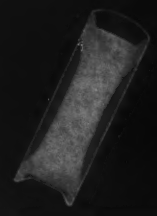


**inductron®** *induction hardening*

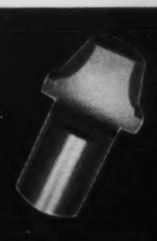
**Cincinnati does both—selective flame or induction hardening**—and the parts shown at right are typical of those that can be hardened by either method. If that's your situation, then talk to Cincinnati . . . headquarters for equipment that gives you the hardness wanted, where it's wanted, using the heat source most economical for you. Use electric power or acetylene, propane, natural or manufactured gas whichever is readily available to you or provides lowest cost.

Whether flame or induction, you can be assured of heat-treating machinery that will deliver the hardness you specify, and meet your cost-per-piece requirements, on high production quantities or varied, small-lot runs. It will be excellently engineered, equipped with the finest of components, thoroughly safeguarded, easily maintained.

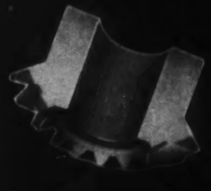
Call in a Process Machinery Division field engineer. He is ideally equipped to evaluate your needs and give you unbiased recommendations as to the most economical equipment for your selective surface hardening work.



Transmission pinion pin



Locking pin



Bevel gear

Steering arm ball stud

Locking pawl

CINCINNATI

**flamatic and inductron** *hardening machines*

THE PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

# Instant automatic heat solves chilly morning problem in Texas

Early morning temperatures go below freezing during part of the year in Texas but, as the sun climbs, the thermometer quickly rises to 75° and higher.

To take care of such rapidly changing conditions, Oil Well Supply Division of United States Steel Corporation chose Dravo *Counterflo* heaters for their Garland, Texas plant and warehouse. The six 2,000,000 Btu per hour heaters provide heat instantly during the chilly morning hours and stop automatically when comfort temperatures are reached—no delay, no wasted fuel.

Dravo *Counterflo* heaters require minimum capital investment, low installation costs, and are economical to operate. For specific help on a problem involving any of the Dravo products and services shown below, write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

**DRAVO**
CORPORATION

Blast furnace blowers · boiler & power plants · bridge sub-structures · cab conditioners · docks & unloaders · dredging · fabricated piping

foundations · gantry & floating cranes · gas & oil pumping stations · locks and dams · ore & coal bridges · process equipment · pumphouses & intakes

river sand and gravel · sintering plants · slopes, shafts, tunnels · space heaters · steel grating · towboats, barges, river transportation

# Adler: How Research Can Be Sales Tool

CUSTOMER SERVICE pays off in the research laboratory, too.

"That's our philosophy at National-Standard Co.," says Orville E. Adler, director of research. "Customer service plays a big role in our research program; we get a couple of hundred requests annually to help solve their problems."

**Problem Solver**—Because of National-Standard's experience with wire drawing and wire products, it can give many answers immediately. Other problems may take several days or longer. Typical requests:

A ball point penmaker found that a jiggling spring in its mechanism was objectionable. Could National-Standard's springs be plastic coated to eliminate this? N-S lab experts found a more economical solution: Use springs of a slightly larger diameter.

Another company was having embrittlement problems when it cadmium plated N-S wire. The solution was found in the company's own plant. A change in its heat treating process was required.

**Common Sense**—"Certainly, good judgment must be exercised in taking on customer projects," Mr. Adler points out. "There are always some we can't handle, but you can't always apply a dollar and cents yardstick. Some projects are worthwhile strictly because of their informational value. Probably 5 per cent of our customer requests have nothing to do with the products we make."

One important factor not to overlook: The customer comes first in the laboratory, too. "Even though we never charge for our services," Mr. Adler emphasizes, "we'll interrupt long-term projects to tackle a customer problem."

**From Childhood**—Orville Adler grew up almost in the shadow of National-Standard's plant at Niles, Mich. "On my way to the swimming hole, I used to sneak in the back door and watch them make tire grommets." After graduating from Michigan State University with a chemical engineering degree, he immediately went to work for N-S. He played a major role in the development of the electroplating process which makes it possible to copper coat large wire or rod, then draw it to finer sizes. The coating does not slip or spall. He has been head of the 14-man research department for the last four years.

A hurdler and discus thrower on the track team during his college days, Mr. Adler confesses he now resorts to less strenuous activities like golf for diversion. Like many other metalworking executives, he's community minded. He serves on the school board and city planning commission.

**Industrial Conveyor Shipments Rise**

| | |
|---|---|
| 1956* | $300,000,000 |
| 1955 | 265,000,000 |
| 1954 | 285,000,000 |
| 1953 | 304,000,000 |
| 1950 | 158,000,000 |
| 1940 | 44,000,000 |

*Estimated by STEEL.
Other figures: Conveyor Equipment Manufacturers Association.

Mathews Conveyer Co.

# Conveyors Keynote Growth

## Since Henry Ford blazed the trail in 1913, they have enjoyed a continuous sales gain. New markets, need for cost cutting, assure business prospects

AUTOMATION and the general trend to mechanization are spurring conveyor equipment business in a diversity of lines—in metalworking and manufacturing of all types, warehousing and distribution, mining and quarrying, road building, food processing and transportation.

Sales this year will exceed last year's volume of $265 million and may approach, if not equal, 1953's all-time peak of $304 million, say industry leaders. Hewitt-Robins Inc., Stamford, Conn., is "extremely optimistic for the current year and the first half of the next," noting particularly the likelihood of continued substantial capital expenditures. Incidentally, 1956 may be the company's best year for sales.

**Trends**—The need for the development of new sources for iron ore and for specific minerals for atomic requirements has stepped up exploratory work in this country, the Western Hemisphere and throughout the world. American-built conveyor equipment is contributing its share to the mechanization of these operations.

Quarrying activities have increased greatly to meet the heavy demands of the country's road building programs. This, too, means business for conveyor equipment manufacturers. Another source: At long last, coal is coming out of its slump.

**Dollar Split** — Conveyor equipment is one of the six major categories of the material handling industry—the other five are lift trucks and portable elevators, casters and floor trucks, monorails, industrial tractors and fork trucks, and cranes and hoists. Combined business last year amounted to about $1.5 billion.

Based on a projection of present trends and using reliable forecasts of trends in plant and equipment expenditures, it has been estimated that sales of material handling equipment in ten years will run $2.25 billion annually in terms of today's dollar. Sales of conveyor equipment alone should hit $500 million.

**Integral**—Discussing the history of conveyors, W. V. Casgrain, president, Mechanical Handling Systems Inc., Detroit, points out that the first application in a manufacturing operation was by Henry Ford in 1913. From then on through the 1920s, he says, conveyors became so integrated into the whole manufacturing operation that they covered rather completely "the function of transportation in connection with the receipt, storage and distribution of raw materials and also invaded the processing operations, such as machining, heat treating, plating, painting, and all the subassembly and final assembly operations." Since then, he adds, conveyors have become an integral part of the manufacturing process, with applications being constantly broadened and refined.

He foresees many technological advances over the next ten years which will be linked closely with electronics and automation.

**Future**—R. C. Sollenberger, executive vice president, Conveyor Equipment Manufacturers Association, Washington, envisions endless belt conveyors stretching across the landscape, such as the projected belt conveyor across eastern Ohio to handle coal in one direction and ore in the other. He thinks a continuous flow of solids on conveyor belts is just as feasible as a continuous flow of oil in pipelines that extend hundreds of miles. He notes the growing possibilities of moving sidewalks and underground belts to deliver freight in metropolitan areas.

**Old Friends**—Touching on automation, O. H. McCleary, vice president and general manager, Mathews Conveyer Co., Ellwood City, Pa., says: "To a company like ours, which designs and builds conveying systems, it simply means further emphasis on the continuous flow of materials in process. Automation is a relatively new word for an idea that is certainly not new to conveyor manufacturers.

"This accent on automation has, of course, had an effect in our industry. There is increased interest in automatic features in conveyor systems, and a broader application of them. Obviously, materials must be handled faster and in greater volume in the modern, high production metalworking plants.

"As processing machinery speeds up and operations become automatic, or nearly so, the conveyors must keep pace. It is the conveying system which must get the materials in process to the machines, into them, out again, and finally away to storage and shipping, with a minimum of rehandling and confusion. Actually, it is the conveying system, engineered for each specific job, which makes automation possible."

# Weldments Pick Up Steam

## Both jobbing and captive producers are enthusiastic about sales. High capital spending and expanding markets are important factors in the growth picture

LOOK for higher weldment sales in 1957, continuing the rising curve of the last two years.

One producer bets on a 50 per cent sales gain: "We're already sold out through the first six months." Though this is unusual optimism, all makers are confident.

**Markets** — Bullishness stems from market diversity. Based on record predictions for new plant and equipment spending, the stand-bys — machinery, shipbuilding, mining and construction machinery, power and chemical plants —all look good.

G. A. Firestone, general manager, Acme Welding Division, United Tool & Die Co., West Hartford, Conn., thinks improved weldment technology is helping to broaden markets still more. New applications range from vacuum chucks for aircraft skin mills to atomic energy uses.

W. M. Broxham, vice president of sales, Graver Tank & Mfg. Co. Inc., East Chicago, Ind., points to automatic welding, increased use of high-deposit electrodes, alloys and high strength steels, and improved positioning equipment as significant among technical developments.

**Problems**—W. F. Sheetz, president, R. C. Mahon Co., Detroit, comments that the steel plate shortage limits production and is delaying press deliveries. Other makers add that in addition to the perennial problems of price cutting and labor shortages, they are also getting new headaches deciding whether they should offer a machining service.

Some, like Falk Corp., Milwaukee, point out that you can lose business if you can't do a complete job. Over-all, though, the outlook is excellent.

**Brighter Side**—Point out Lewis Welding & Engineering Corp., Bedford, O., and Lukenweld Division of Lukens Steel Co., Coatesville, Pa.: "Atomic energy, for instance, has attractive possibilities. The field will account for increasing business, both in power station structures and in pressure vessels themselves."

This busy shop scene at Falk Corp., Milwaukee, is typical

NATIONAL STEEL CORPORATION

# How Great Lakes Steel *launches* quality

You're at 400 feet, banking for a good close look at the unloading operation of the *Ernest T. Weir*. She's packed to the gunwales, stem to stern, with ore—tons of iron-bearing food for Great Lakes hungry blast furnaces.

What's this got to do with turning out top-quality steel at Great Lakes? Plenty! For quality pig iron can only come from quality raw materials—like the *Weir's* rich cargo. And, of course, quality pig iron is the very backbone of top-quality steel.

Control of quality at Great Lakes begins right at the mines. In fact, each ore source is picked with painstaking care. Then, repeated checks in the mines—*double checks* here at the unloading docks—put the quality of Great Lakes raw materials beyond question!

It's that kind of control (from start to finish) that gives our flat-rolled products uniform quality—assures that they will reach our customers exactly when and as ordered. We're ready to talk your steel needs whenever you are.

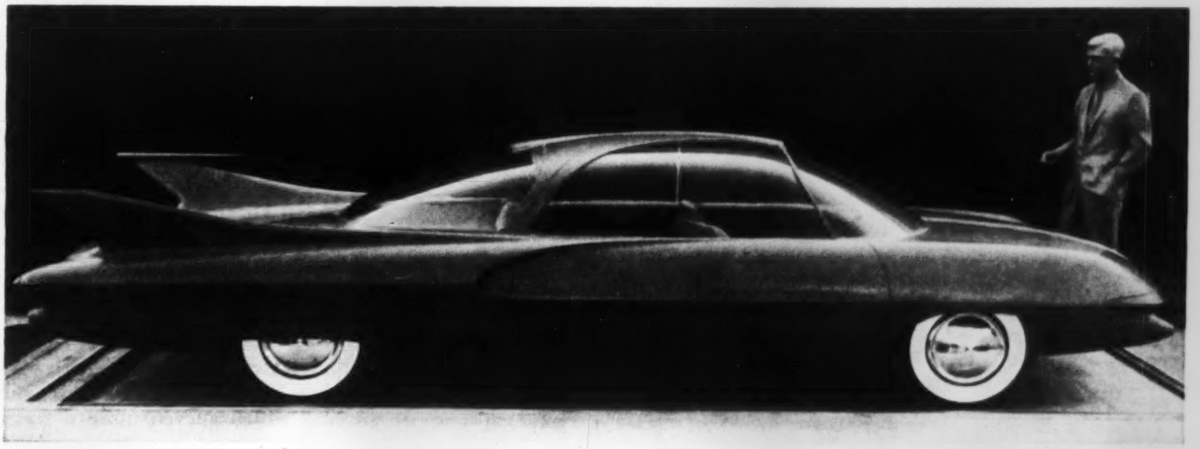
**GREAT LAKES STEEL CORPORATION**

**Detroit 29, Michigan • A Unit of**

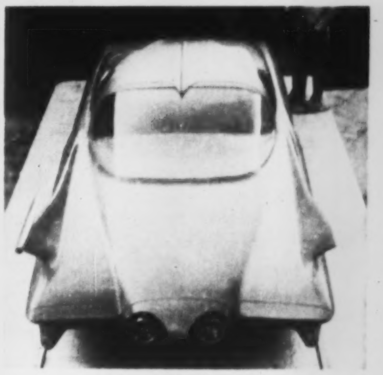
**NATIONAL STEEL CORPORATION**

***District Sales Offices:*** **Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.**

TO ASSURE TOP-QUALITY OPEN-HEARTH STEEL . . . iron ore (shown stockpiled here), coal and limestone—all of known source and quality—are sampled and tested over and over again by Great Lakes Steel raw material analysts.



These Chrysler clay mock-ups point out roof lines stylists are thinking about



# Roofs Ready for Redesign

## Look for the biggest styling and structural changes to come in that portion of the auto body. Lower car heights will lead to internally supported, flatter tops

AUTO ROOFS will get more attention in the future. The 1957 cars appearing in dealer showrooms reveal why: Stylists have to make roofs more attractive because they are being lowered to eye level.

Plastics, glass, stainless steel and aluminum are possible materials. Sliding panels, internally supported roofs and retractable roofs are being considered.

**On the Road** — Scheduled for 1957 production are Ford's retractable hardtop, the brushed stainless steel top on Cadillac's Eldorado brougham, a fabric covered top on another Cadillac model and, of course, the plastic top (and body) on Chevrolet's Corvette.

Styling trends for grilles, quarter panels, and interiors, to some extent, are pretty well firmed up in 1957 cars. They won't be undergoing radical changes for another four or five years. Designers think this year is the time to start on roofs.

**In the Air**—"Roofs will be flatter. Compound curved windshields and doors in the roof will turn the roof section into a smaller panel. We may see roof rails running across the car instead of longitudinally. They can be formed as part of the roof on the outside to give a pleasing appearance," says Henry T. King, chief stylist of Chrysler's engineering division.

Like those on the Packard Predictor dream car, roof lines may run parallel to the belt lines of autos instead of curving down toward the rear deck. In such a case, the entire rear window area will be changed. It probably will form a reverse angle from its present position, will be flat rather than a wrap-around. This avoids the lack of rear seat headroom which still plagues designers.

**Sliders**—Sliding roofs will turn up as an optional item on two luxury lines by 1960. This has been a popular gimmick on European cars for years. G. O. Goller, sales representative for Golde & Co., Frankfort, Germany (sliding roof makers), reports that in the last few years between 30 and 40 per cent of all European car owners have installed movable panels. Volkswagen is one of the larger producers which includes them as a regular production item.

Most sliding roofs on foreign cars are folding fabric panels which are manually operated or turned back with a crank. A few steel panels slide back under the regular roof. They're pushed by hand or operated electrically, Mr. Goller told members of the American Society of Body Engineers at its annual Detroit convention.

When the sliding roofs are adopted over here, button pushing Americans won't settle for anything less than the electrically operated type. The panels will slide between roof and headliner so none of the supporting and operating mechanism will be in sight.

**Glass** — Russell G. Whittemore,

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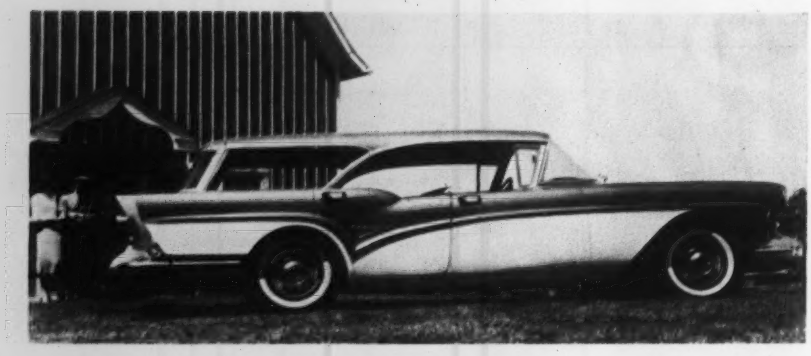

**Buick's Century Caballero for 1957**

This 300-hp estate wagon will list for around $3332. It has a 364 cu. in. engine, compared with the 322 in 1956 cars. Ball joint front suspension and wider frames with body between side rails are additional features

manager, product development, glass division, Pittsburgh Plate Glass Co., Pittsburgh, believes that it's possible to form glass roof panels which will be structurally as strong as steel. But he admits to ASBE members that the two major problems are heat absorption and brightness control.

Glass roofs now absorb heat and would transmit too much light. Tinted laminated glass can be made which will solve these problems, but Mr. Whittemore says it would be too heavy. One-piece tempered glass is stronger, particularly when loaded in compression, but present types lack necessary translucent qualities.

"A range of 15 to 20 sq ft seems like a top limit for glass parts," he says. It looks like more research is needed before glass roofs will make their appearance.

**Plastics** — This material seems like a natural for roofs, but designers seem to shy away from it for volume production lines. Plastic will be used more for interior trim, but it still is subject to clouding on exterior applications, and it's more easily gouged than steel.

Plastic roofs are easy to make and handle. Material costs are lower than those for steel. Chevrolet has found plastic works well on its Corvette even though drivers find it's a tough one-man job to bolt tops on or take them off.

Mr. King pretty well sums up the feelings of stylists when he says: "I don't see what can be done with plastics that can't be done with steel." The economics involved in tooling for a different material make it a pretty safe bet that steel will be popular for a long time.

**Newcomers**—Stainless steel and aluminum are two metals mentioned for roofs (STEEL, Oct. 29, p. 93). Says Mr. King: "We probably will see aluminum panels overlaid on steel within the next five years. It offers a decorative but not a gaudy appearance."

Stainless will be used more in high priced lines because stylists feel the metal gives a sense of formal simplicity. It can be welded to roof supports. Aluminum has to be brazed or fastened in a more expensive manner.

### U.S. Auto Output

Passenger Only

| | 1956 | 1955 |
|---|---|---|
| January | 612,079 | 659,508 |
| February | 555,596 | 675,495 |
| March | 575,234 | 794,015 |
| April | 547,766 | 753,851 |
| May | 471,533 | 724,892 |
| June | 430,279 | 649,393 |
| July | 448,804 | 659,763 |
| August | 401,996 | 614,493 |
| September | 190,709† | 461,591 |
| 9 Mo. Total | 4,233,996† | 5,993,001 |
| October | | 517,813 |
| November | | 749,061 |
| December | | 682,257 |
| Total | | 7,942,132 |
| Week Ended | 1956 | 1955 |
| Sept. 29 | 43,369 | 115,723 |
| Oct. 6 | 59,351 | 80,271 |
| Oct. 13 | 70,175 | 101,581 |
| Oct. 20 | 88,557 | 137,425 |
| Oct. 27 | 112,493† | 158,430 |
| Nov. 3 | 125,000* | 167,278 |

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Both metals offer a natural finish which is better than paint from the styling point of view, but they'll have to compete with fabric roof covers which are coming back in favor. Fabric will increase in limited areas on roofs—mostly on high priced cars.

**Support**—While stylists can consider all these roof materials, engineers have to figure out how to support them structurally. Ribs stamped into roofs will be the first step.

Chrysler's experimental Norseman (which went down with the *Andrea Doria*) had cantilever arches which curved upward from the rear of the frame and over the passenger compartment. Such construction does away with the need for supporting posts and pillars.

While cantilevers aren't in the immediate future, roofs shape up like this for 1958: They'll be flatter, with stamped ribs for strength and beauty. Some overlay panels of aluminum or fabric will appear on luxury autos. Big volume lines will have conventional construction.

## GM-Ford Report Sales

Harlow H. Curtice, GM's president, indicates that sales are 15 per cent behind last year's. Total GM vehicle sales at the three-quarter mark: 3.1 million this year, vs. 3.9 million last year.

Ford reports factory sales of all trucks and cars were 1.4 million units for the first nine months, vs. 1.9 million at that time last year.

## Stainless Goes Overseas

Reports coming in from the London Auto Show reveal that British car builders are looking at stainless rather than chrome plated steel for exterior trim.

British stainless producers say builders are beginning to make the switch this year. Such stainless items as radiator grilles, window moldings, hubcaps and bumpers will appear on Austin, Morris, Ford, Hillman and Sunbeam cars.

According to British sources, American and continental auto makers use much more stainless than they do.

**ONE OF A SERIES . . .**

## What makes a cylindrical roller bearing good?

## SUPERIOR QUALITY of INNER RACES

**The function of an inner race is to provide a fatigue-resistant surface between a shaft and the bearing rollers. Because of roller bearing geometry, there is a smaller area of contact between inner race and rollers than between outer race and rollers. This concentrates more load on the inner race and makes it the critical member from a fatigue life standpoint, particularly when the inner race is the stationary member and maximum load is repeatedly applied at one point.**

**Since it is vital to good performance that the inner race does not work loose on the shaft, HYATT inner races are designed for relatively heavy press fits, so the inner race becomes an integral part of the shaft for all practical purposes. Other advantages of HYATT'S carburizing process and precision finishing operations are briefly explained at right.**

**You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your design requirements. Remember, HYATT is America's *first* and *foremost* maker of roller bearings.
Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.**

GM
GENERAL MOTORS

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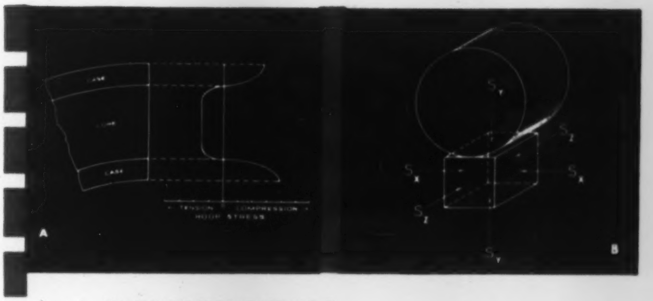
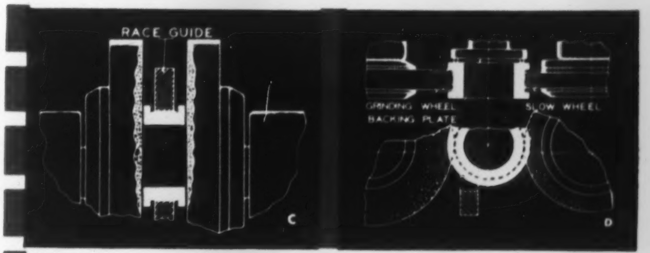
**FOR MODERN INDUSTRY**



### 1. WHY CARBURIZING?

Carburizing provides inner races with tough cores, and flanges that will not crack, with no loss of case hardness. This permits tight press fits and also improves load-carrying capacity as shown in Diagram A. During quenching, a volumetric change tends to stretch the core and compress the case. Due to the Poisson effect, the compressive hoop stresses in the external fibres build up the load-carrying capacity.

Diagram B shows a typical element under roller load. Stresses in the "Z" direction are negligible; those in the "X" direction are compressive hoop stresses or pre-load. Those in the "Y" direction are compressive stresses due to the load. Without the compressive stress Sx (hoop stress) the load capacity would be reduced; and if "X" were a tensile stress due to pressing a through-hardened race on a shaft, the bearing capacity would be still less.

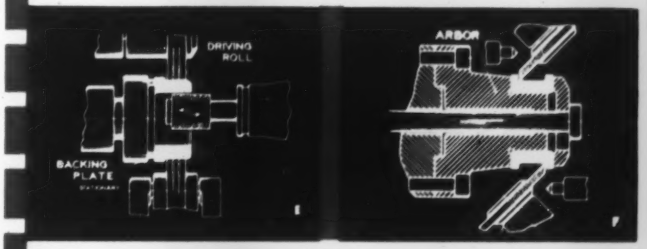


### 2. DOUBLE END GRIND

In grinding a HYATT inner race, the ends are first faced off square and parallel so they can be used as accurate reference during subsequent operations. The HYATT double end grind process (Diagram C) insures excellent control of parallelism.

### 3. CENTERLESS PATHWAY GRIND

Centerless grinding was pioneered by HYATT years ago, and eliminates excessive wall variation due to spindle and chucking errors. This method produces as nearly a perfect cylinder as is commercially practical. Two-point and three-point out of round and taper are held to a minimum. Note how work is rotated with backing plate against previously ground end (Diagram D) to insure accuracy.



### 4. CHUCKLESS BORE GRIND

Here the centerless method assures a bore concentric with the pathway, with minimum wall variation, by removing stock from high spots as they pass between drive roll and related grinding wheel (Diagram E).

### 5. FLANGE GRINDING

To assure that they will run true with roller pathway, flange faces are also ground using the squared ends for reference (Diagram F). This establishes even contact with roller ends during bearing operation.

# "A wing and a prayer" ...and plenty of nuts and bolts!

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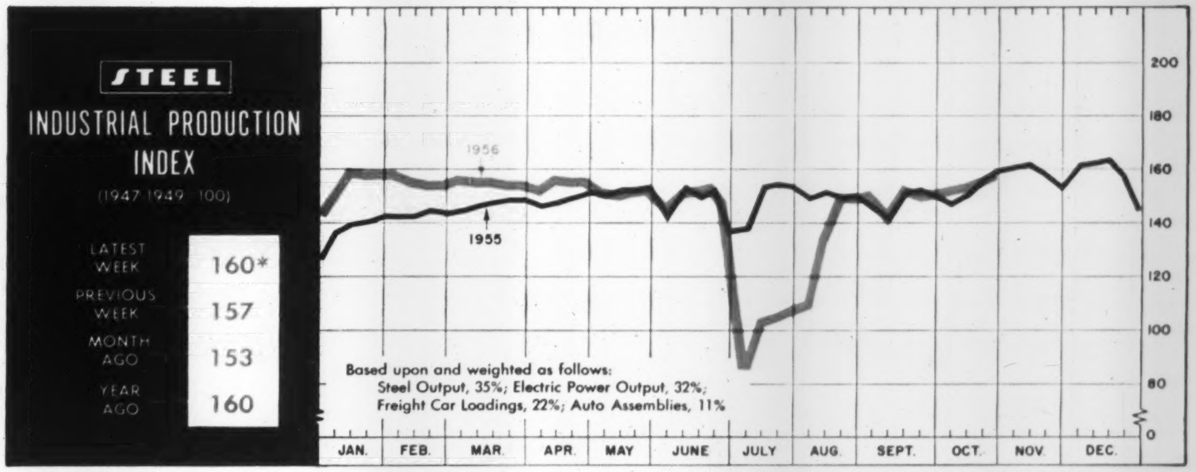

Based upon and weighted as follows:
Steel Output, 35%; Electric Power Output, 32%;
Freight Car Loadings, 22%; Auto Assemblies, 11%

*Week ended Oct. 27.

# Election Eve Facts Show Strong Economy

THE NATION'S economy has come in for more than its share of kicking around in this political campaign. Even the most astute student of business affairs begins to wonder what the "facts" are. Just to set the record straight on the day before the big election, here are a few facts about some areas of the economy most often referred to by both parties.

**Employment**—With the exception of August, when students swelled the payrolls, never have there been so many people employed in America. In September, the figure was 66,071,000. It was considerably higher in October, if for no other reason than the return to work of thousands of automotive workers.

**Unemployment** — Although the civilian labor force has grown almost 8.2 per cent since January, 1954, unemployment has declined 35.3 per cent, slipping under 2 million during September for the first time since November, 1953.

**Earnings**—Personal income is at an all-time high: An annual rate of $328.2 billion during August, or an increase of 3.6 per cent since the beginning of this year. Even the income of farmers has gone up—from an annual rate of $2.57 billion in August, 1955, to $2.715 billion in August, 1956. Average family income after taxes, in terms of 1955 dollars, was $4980 last year. In 1947, the average was only $4380. Last year, only 30 per cent of all families earned less than $5000 a year. As recently as 1953, the figure was 58 per cent.

**Cost of Living** — In January, 1952, the consumers' price index of the Bureau of Labor Statistics stood at 113.1 per cent of the 1947-1949 average. In September, the index rose to a record 117.1 per cent. That's an increase of 3.5 per cent at a time when personal income rose more than 24 per cent. The government's other price index—wholesale—presents a different picture. Since January, 1952, it has advanced from 113.0 per cent of the 1947-1949 average to 115.3, or 2 per cent. Or you can

## BAROMETERS OF BUSINESS

| | LATEST PERIOD* | PRIOR WEEK | YEAR AGO |
|---|---|---|---|
| **INDUSTRY** | | | |
| Steel Ingot Production (1000 net tons)[2] | 2,486[1] | 2,491 | 2,400 |
| Electric Power Distributed (million kw-hr) | 11,400[1] | 11,333 | 10,659 |
| Bituminous Coal Output (1000 tons) | 10,475[1] | 10,230 | 9,773 |
| Petroleum Production (daily avg—1000 bbl) | 7,000[1] | 6,997 | 6,750 |
| Construction Volume (*ENR*—millions) | $550.5 | $446.6 | $295.2 |
| Auto, Truck Output, U. S., Canada (*Ward's*) | 142,612[1] | 117,930 | 188,283 |
| **TRADE** | | | |
| Freight Car Loadings (1000 cars) | 825[1] | 829 | 835 |
| Business Failures (Dun & Bradstreet) | 254 | 259 | 239 |
| Currency in Circulation (millions)[3] | $30,864 | $30,953 | $30,498 |
| Dept. Store Sales (changes from year ago)[3] | −3% | +5% | +8% |
| **FINANCE** | | | |
| Bank Clearings (Dun & Bradstreet, millions) | $22,269 | $21,010 | $21,113 |
| Federal Gross Debt (billions) | $275.6 | $273.9 | $280.0 |
| Bond Volume, NYSE (millions) | $15.9 | $15.2 | $18.8 |
| Stocks Sales, NYSE (thousands of shares) | 7,848 | 8,175 | 8,992 |
| Loans and Investments (billions)[4] | $86.1 | $85.3 | $85.5 |
| U. S. Govt. Obligations Held (billions)[4] | $26.4 | $25.7 | $31.1 |
| **PRICES** | | | |
| STEEL's Finished Steel Price Index[5] | 225.58 | 225.58 | 208.90 |
| STEEL's Nonferrous Metal Price Index[6] | 254.1 | 265.4 | 264.1 |
| All Commodities[7] | 115.0 | 115.2 | 111.1 |
| Commodities Other Than Farm & Foods[7] | 123.0 | 123.1 | 118.7 |

---

*Dates on request. [1] Preliminary. [2] Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3] Federal Reserve Board. [4] Member banks, Federal Reserve System. [5] 1935-1939=100. [6] 1936-1939=100. [7] Bureau of Labor Statistics Index, 1947-1949=100

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THERE WITH 1 STROKE WAS THE "IMPOSSIBLE" FLANGE!

**Massey-Harris-Ferguson Limited of Toronto** came to Presteel with a pressing problem: They had just designed the first all-stainless-steel cream separator. It involved a flange-forming puzzle, however.

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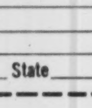

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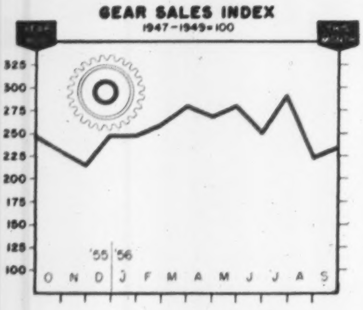
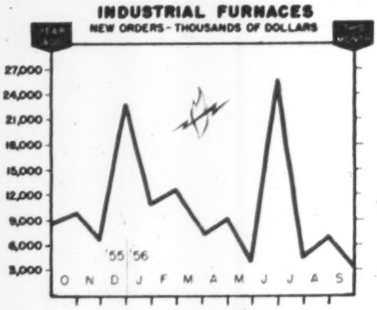
## THE BUSINESS TREND



| | 1956 | 1955 | 1954 |
|---|---|---|---|
| Jan. | 245.5 | 140.9 | 167.4 |
| Feb. | 256.2 | 148.5 | 165.1 |
| Mar. | 276.5 | 172.8 | 128.6 |
| Apr. | 264.7 | 179.8 | 158.2 |
| May | 275.6 | 205.2 | 132.5 |
| June | 245.4 | 193.5 | 127.4 |
| July | 286.7 | 201.7 | 141.3 |
| Aug. | 219.5 | 217.6 | 154.7 |
| Sept. | 230.5 | 246.5 | 135.1 |
| Oct. | .... | 227.6 | 152.3 |
| Nov. | .... | 210.4 | 116.7 |
| Dec. | .... | 245.5 | 182.2 |

American Gear Mfrs. Assn.

Charts copyright, 1956, STEEL.



| | 1956 | 1955 | 1954 |
|---|---|---|---|
| Jan. | 10.244 | 4.973 | 3,643 |
| Feb. | 12,163 | 5,616 | 3,086 |
| Mar. | 7,025 | 7,345 | 4,079 |
| Apr. | 8,803 | 7,639 | 3,496 |
| May | 3.620 | 6,205 | 5,848 |
| June | 25,597* | 10,616* | 5,663 |
| July | 4,140 | 4,338 | 1,664 |
| Aug. | 6,722 | 6,273 | 2,570 |
| Sept. | 3,057 | 8,351 | 2,534 |
| Oct. | .... | 9,568 | 3,837 |
| Nov. | .... | 6,180 | 3,188 |
| Dec. | .... | 22,548* | 6,847 |

*June, 1955, and 1956 and December, 1955, figures include steel mill furnace orders.

Industrial Heating Equipment Assn. Inc.

figure it another way: The index dipped to 109.4 per cent of the base period in April, 1953, making the increase 5.4 per cent. In any case, the wage earner is better off today than he was four years ago.

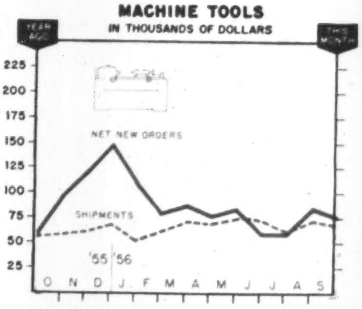
**Production** — Gross National Product, the measure of all goods and services produced in the U.S., is at an all-time high, estimated at an annual rate of about $412 billion during fourth quarter. The Federal Reserve Board's industrial production index is at the record level of 144 (1947-1949 = 100). STEEL's production index during the week ended Oct. 27 equaled the second highest figure of the year (160 per cent of the 1947-1949 average), and it's still climbing.

**Plant, Equipment**—Businessmen are planning to spend at an annual rate of $38 billion for plant and equipment this quarter. The preliminary estimate for the third quarter was $36.3 billion. On the basis of those figures, expenditures for the year will total $35.3 billion, 23 per cent above the record set last year.

**Construction**—This year will see $44.5 billion worth of construction put in place, about $1 billion ahead of last year. The total will be even higher next year (see page 65). Even though housing starts will fall to about 1.1 million this year, it will be the eighth consecutive year for 1-million-plus starts. Dollar value has suffered little during that time.

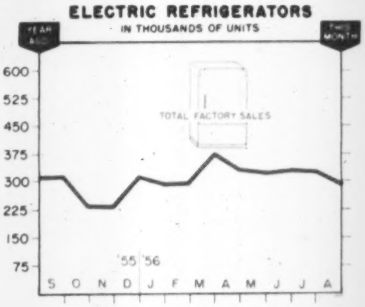
**Business Community**—The number of corporations active today is higher than ever before. It is true that you have to go back to pre-World War II days to find a blacker picture in business failures, but the record number of new incorporations has more than offset failures. More failures occur in the $5000-$25,000 class than in any other, partly because there are more companies in that class. But percentagewise, the $1 million and over class accounts for its share. At the end of 1955, there were 60,000 more business establishments than at the end of 1954. This year will see an even greater increase.

**Sales**—Metalworking will rack up $138 billion in sales this year, a record to shoot at in the future. Sales all the way down the line are ahead of any previous comparison period. To date, department store sales are 4 per cent ahead of those in the corresponding 1955 period, although some of the in-



| | New Orders 1956 | New Orders 1955 | Shipments 1956 | Shipments 1955 |
|---|---|---|---|---|
| Jan. | 109,550 | 57,650 | 54,600 | 49,500 |
| Feb. | 81,300 | 58,000 | 64,600 | 49,750 |
| Mar. | 89,500 | 60,650 | 74,150 | 59,900 |
| Apr. | 79,300 | 50,250 | 71,800 | 53,250 |
| May | 87,100 | 68,700 | 76,800 | 53,500 |
| June | 61,850 | 74,550 | 76,250 | 58,800 |
| July | 61,900 | 62,200 | 65,150 | 45,200 |
| Aug. | 87,500 | 62,050 | 75,100 | 48,650 |
| Sept. | 79,550* | 58,350 | 71,150* | 57,800 |
| Oct. | ...... | 99,150 | ...... | 60,400 |
| Nov. | ...... | 124,250 | ...... | 63,350 |
| Dec. | ...... | 151,300 | ...... | 70,300 |
| Totals | ...... | 927,100 | ...... | 670,400 |

*Preliminary.
National Machine Tool Builders' Assn.



| | Total Factory Sales—Units 1956 | 1955 | 1954 |
|---|---|---|---|
| Jan. .... | 292,090 | 381,197 | 344,401 |
| Feb. .... | 298,742 | 338,575 | 334,122 |
| Mar. .... | 381,485 | 392,774 | 330,641 |
| Apr. .... | 334,020 | 364,298 | 280,900 |
| May .... | 327,874 | 390,385 | 282,164 |
| June .... | 335,068 | 395,936 | 303,127 |
| July .... | 331,916 | 323,240 | 325,061 |
| Aug. .... | 297,906 | 310,789 | 256,665 |
| Sept. .... | ...... | 313,143 | 271,859 |
| Oct. .... | ...... | 235,945 | 190,753 |
| Nov. .... | ...... | 234,786 | 175,557 |
| Dec. .... | ...... | 312,535 | 228,612 |
| Totals ... | ...... | 3,993,603 | 3,323,562 |

National Electrical Mfrs. Assn.

crease is accounted for by increased prices.

**Credit, Savings**—Both are well above any previous levels. Total installment credit at the beginning of September was about $30.6 billion, and it'll go higher now that new cars are in the showrooms. But the rate of increase this year has been far below the phenomenal rate of a year ago. Payments on debt have been exceptionally good, reports show. Consumers have more cash stashed away than ever before.

These facts are from authoritative sources. They are not all the facts, and may not be the ones you hear quoted on political TV commercials. In many cases, they are broken down into so many segments that there is a fact to prove any point. But one thing is clear: Viewed as a whole, the American economy has never been better off.

## Industries Optimistic

Reports from various metalworking industries reflect this high level of business. Gear manufacturers' sales for the first ten months of 1956 have averaged 230.1 per cent of the 1947-1949 base period, almost the same figure reported (see chart, page 84) for September.

After peaking in May, the order index reported by the Foundry Equipment Manufacturers Association hit bottom in July, then bounced back up to 188.3 (1947-1949 = 100) in August. Although considerably below the 207 in May (manufacturers admit it was not an ordinary month), the latest figure is the third highest this year.

Even though September suffered a sizable loss, manufacturers of industrial furnaces increased their business 33 per cent in the first ten months of 1956, compared with the corresponding period last year (see chart, page 84). The total so far this year is $81,371,521.

Machine tool manufacturers expect to set a peacetime record for new orders this year—between $950 million and $1 billion. Through September, the total stands at $737,550,000. Shipments for the same period total $629.6 million. (See chart above.)

New orders for industrial supplies in September were the best since last April and the third highest for the year, says the American Supply & Machinery Manufacturers' Association. The index registered 200.7 (July, 1948 = 100).

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JOHN H. ALLISON
. . . Simonds Worden White v. p.-sales

JOHN W. GOSSELIN
. . . Phoenix Mfg. executive v. p.

**Charles W. Wesson** was made general manager in charge of factory operations at **Eastern Machine Screw Corp.**, New Haven, Conn. He was vice president-general manager in charge of Lift Lock Hardware Industries Ltd., Canadian subsidiary of Sargent & Co.

**George Friedl Jr.** was named vice president of **Litton Industries**, Beverly Hills, Calif. Before joining the firm Nov. 1, he was vice president and director of advanced planning at Link Aviation Inc.

**Edward McClaud** was made chief engineer of **Parker Stamp Works**, Hartford, Conn. He joined Parker in January and formerly was with Pratt & Whitney Aircraft Co.

**Frank C. McManus** was elected president of **Anthony Co.**, Streator, Ill. He succeeds **Glenn A. Duis**, resigned.

**Richard B. Lord** was made director, product development division-commercial department of **United States Steel Corp.**, Pittsburgh. He succeeds **L. S. Brock**, recently made assistant manager, structural and plate steel sales division.

**R. Elwood Gray** was named works manager, commercial division, **Kaiser Metal Products Inc.**, Bristol, Pa., Kaiser Industries Corp. He succeeds **L. W. Wyman**, resigned.

**John H. Allison** was elected vice president-sales, **Simonds Worden White Co.**, Dayton, O.

**Hugh A. Cole** was elected executive vice president of **Igoe Bros. Inc.**, New York.

**Samuel P. Caldwell** was named to the new post of director of research and development, **Greist Mfg. Co.**, New Haven, Conn. He was vice president and assistant general manager, Air-Marine Division.

**Frank C. Riecks** was elected executive vice president, **Sutter Products Co.**, Dearborn, Mich. He recently retired as technical assistant to the manager of foundries at Ford Motor Co.

**Mark T. Anthony** was made assistant to the vice president-general manager, **Kaiser Steel Corp.**, Oakland, Calif. He succeeds **A. F. Scarr**, now assistant general manager of Kaiser Center Inc.

**O. Jay Myers** was named vice president, foundry division, **Reichhold Chemicals Inc.**, White Plains, N. Y. He was with Archer-Daniels-Midland Co.

**Floyd Harl** was made machine shop manager, **Greer Hydraulics Inc.**, **Jamaica, N. Y.**; **Norman H. Schwarz**, sales engineer, East Coast territory.

**John W. Gosselin** was elected executive vice president, **Phoenix Mfg. Co.**, Joliet, Ill. He has direct supervision over the firm's five operating divisions.

**H. R. Leber** was elected a vice president of **Sundstrand Michigan Corp.**, subsidiary of Sundstrand Machine Tool Co., Rockford, Ill. He continues as general sales manager of Sundstrand's machine tool division.

**Lamson & Sessions Co.**, Cleveland, appointed **Robert G. Patterson** assistant to the president; **James G. Rayburn**, vice president-general sales manager.

**Oglebay, Norton & Co.**, Cleveland, elected **Courtney Burton** vice chairman; **E. W. Sloan Jr.**, executive vice president; **A. K. Greene**, vice president-coal sales; **W. D. Hamilton**, vice president-coal operations; **A. B. Rathbone**, vice president-ore sales.

**John Watson**, manager of the Chicago office of **Despatch Oven Co.**, was made manager of the new industrial department, Minneapolis office.

**Phillip Hall** was made industrial sales promotion manager, **A. Schrader's Son Division**, Scovill Mfg. Co. Inc., Brooklyn, N. Y.

**M. S. Stevenson** was named Dallas

**SAM GURLEY JR.**
*. . . H. K. Porter v. p.-sales*

**RAYMOND A. ST. JOHN**
*. . . gen. sales manager at Heald*

**CHARLES M. HAWKINS**
*. . . gen. mgr., Ehrhardt Tool*

branch manager, **Baker-Raulang Co.**

**Sam Gurley Jr.** was elected vice president-sales, **H. K. Porter Company Inc.,** Pittsburgh. He held a similar post with Reichhold Chemicals Inc.

**Kenneth F. Waggener** was made assistant superintendent, Bessemer converter mill, Youngstown district, **Republic Steel Corp.**

**Elmer E. Bieri** was made chief engineer, **Advance Tool & Die Casting Co.,** Milwaukee.

**James J. Hoffer** was made marketing director of **U.S. Industries Inc.,** New York.

**John L. Carnie** was made general manager, can division, **Crown Cork & Seal Co. Inc.,** Philadelphia.

**Bruce A. Guinter** was promoted to plant engineer, **Electro Dynamic Division,** General Dynamics Corp., Bayonne, N. J.

**International Business Machines Corp.,** New York, appointed **Robert W. Schubert** director of laboratory operations. He was assistant director.

**Gerald J. Herrmann** was elected vice president-general manager, **Reno Corp.,** San Diego, Calif.

**William J. Zechel** was made chief automotive design engineer at **American Motors Corp.,** Detroit.

**Raymond A. St. John** was appointed general sales manager, **Heald Machine Co.,** Worcester, Mass. He was Detroit branch sales manager, and is replaced by **Albert A. Arbogast,** with **Gerald P. Robert** as assistant manager.

**Anthony J. Snyder** was made assistant to vice president-sales, **Firth Sterling Inc.,** Pittsburgh. He was sales manager, cutting tool division, Motch & Merryweather Machinery Co., and previously served as vice president-general manager, Morse Twist Drill & Machine Co.

**Edward T. Bryand** joined **Portland Copper & Tank Works Inc.,** South Portland, Me., as supervisor, new products department.

**E. M. Schugar** and **R. V. Miraldi** were elected vice presidents, **Houdaille Industries Inc.,** Buffalo. Mr. Schugar is in charge of government contracts. Mr. Miraldi is in charge of Buffalo Arms Inc., Wales-Strippit Co. (subsidiaries) and the hydraulic division in Buffalo.

**Howe Scale Co.,** Rutland, Vt., appointed **Roy H. Stewart** assistant sales manager-material handling division and manager-motor freight sales.

**Aaron Kaplan** joined **Gas Purifying Materials Co. Inc.,** Long Island City, N. Y., as manager, industrial sales. He was with L. Sonneborn Sons Inc.

**Charles M. Hawkins,** plant manager, was appointed general manager, **Ehrhardt Tool & Machine Co.,** St. Louis.

**John Sheldon** was made production superintendent, Montrose, Pa., division, **Bendix Aviation Corp.** He is succeeded by **Ralph Rosa Jr.** as quality control manager.

**Thomas E. Rounds** was elected vice president, **Barden Corp.,** Danbury, Conn. He is succeeded as chief engineer by **Bruce L. Mims.**

**Edward Foodim** joined **Consolidated Avionics Corp.,** Westbury, N. Y., as chief engineer.

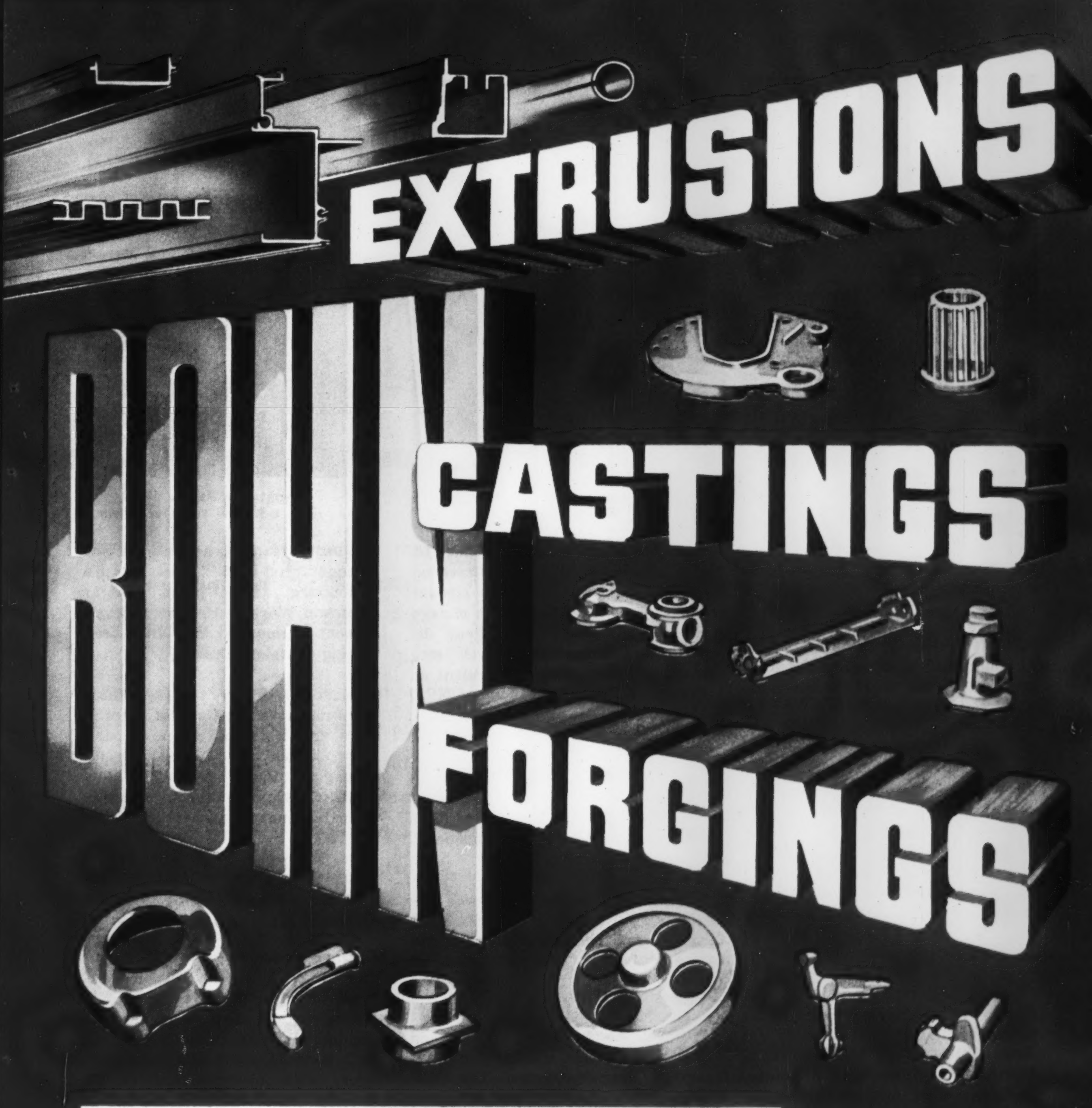
**Oscar J. Olsen** was promoted from purchasing agent to the new post of merchandising manager, **Peter A. Frasse & Co.,** New York. He is succeeded by **Martin Plesinger.**

**Robert C. Gray** was made manager, Dryalator domestic sales, **Orr & Sembower Inc.,** Reading, Pa.

**Hyman Rosenthal** was appointed director of research, **Arwood Precision Casting Corp.,** New York.

**Dr. George Roka** was named director of the semiconductor division of **Marvelco Electronics Division,** National Aircraft Co., Burbank, Calif. He headed semiconductor activities at Delco Radio Division, General Motors Corp.

**Quaker State Metals Co.,** Lancas-



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**AND BRASS**
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FRANK J. SMITH
. . . Columbus Bolt & Forging v. p.

S. SYDNEY MINAULT
. . . National Research v. p.

ROBERT E. HAGEN
. . . supt., U.S. Steel Saxonburg plant

ter, Pa., named **John Zittle** to the new post of director, research and development.

**Frank J. Smith** fills the new post of vice president-marketing, **Columbus Bolt & Forging Co.**, Columbus, O. He was general manager, consumer products division.

At the Ambridge, Pa., plant, **Spang-Chalfant Division**, National Supply Co., **Frederick H. Bremmer** was made superintendent, cutting department; **Joseph A. Frederick Jr.**, chief combustion engineer; **Harry W. Griffith**, superintendent, threading department; **William H. Hunter**, superintendent, mechanical department; **Wilmer G. Seyboth**, superintendent, electrical department.

**George H. McClure** was made assistant manager, central sales, for **Armco Steel Corp.**, Middletown, O. **Matthew J. Foley** was appointed assistant chief engineer.

**S. Sydney Minault** was elected vice president, **National Research Corp.**, Cambridge, Mass. He continues as general manager in charge of the company's equipment division. **Thomas B. Davis** was made production superintendent at the Santa Rosa, Fla., plant of NRC Metals Corp., subsidiary, and **Jack W. Blanton** was named manager of sales development for NRC.

**Roy McMasters** was named plant manager, **Wilkins Aluminum Fabricators Inc.**, South Pasadena, Calif.

**Richard D. Jenkinson Jr.** was appointed Pittsburgh district sales manager, **Pittsburgh Steel Co.** He is succeeded by **Joseph L. Connell** as district sales manager at Warren, O.

**Edward Hartshorne** was named general manager, nuclear fuel division, **Olin Mathieson Chemical Corp.**, New Haven, Conn.

**Robert E. Hagen** was made superintendent of **U.S. Steel Corp.'s** Saxonburg, Pa., plant, Edgar Thomson Works. He was a development engineer at the Oliver Iron Mining Division, Duluth.

**Howard M. Perry** was appointed sales manager for **General Electric Co.'s** small steam turbine department, Fitchburg, Mass. Former manager-product services, he succeeds **Charles B. Seelig**, recently named manager-marketing.

**John E. Gotheridge** was named technical service manager for **Foundry Services Inc.**, Columbus, O.

**Cyclone Fence Department**, American Steel & Wire Division, U.S. Steel Corp., named **Joseph F. Boyce** eastern sales manager, with headquarters in Newark, N. J.; **C. J. Kinman**, southwest sales manager, with headquarters in Ft. Worth, Tex.

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## *OBITUARIES . . .*

**Samuel Polloe**, 65, president, **General Pressed Metal Corp.**, Syracuse, N. Y., died Oct. 16.

**Alfred W. Burg**, 75, retired executive vice president, **Torrington Co.**, Torrington, Conn., died Oct. 10.

**Martin H. Lorenzen**, president and founder, **Hawkeye Steel Products Inc.**, Waterloo, Iowa, died Oct. 12.

**John E. Poorman**, 85, president and founder, **J. E. Poorman Inc.**, Philadelphia, died Oct. 3.

**Jay M. Reilly**, 54, production supervisor, **McManus Steel Corp.**, San Diego, Calif., died Oct. 16.

**Lawrence D. Bell**, chairman and founder, **Bell Aircraft Corp.**, Buffalo, died Oct. 20.

**Harold E. Stavers**, 63, sales manager for the Detroit plant of **Joseph T. Ryerson & Son Inc.**, died Oct. 21.

**Carl C. Joys Jr.**, 68, an assistant to the president of **A. O. Smith Corp.**, Milwaukee, died Oct. 23.

**Joseph D. Walsh**, 64, works manager, **Scullin Steel Co.**, St. Louis, died Oct. 25.

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BETTER ENGINEERING AND CONSTRUCTION SERVICES

THERE are good reasons for the continuous growth of the McKee organization. Because of broad expansion of the industries we serve, our specialized, world-wide services are in greater demand than ever before in our fifty-year history. This demand, in turn, creates unusual opportunities which attract additional engineering and technical experts to the large McKee staff.

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ENGINEERING &
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# Specialists who KNOW rely on

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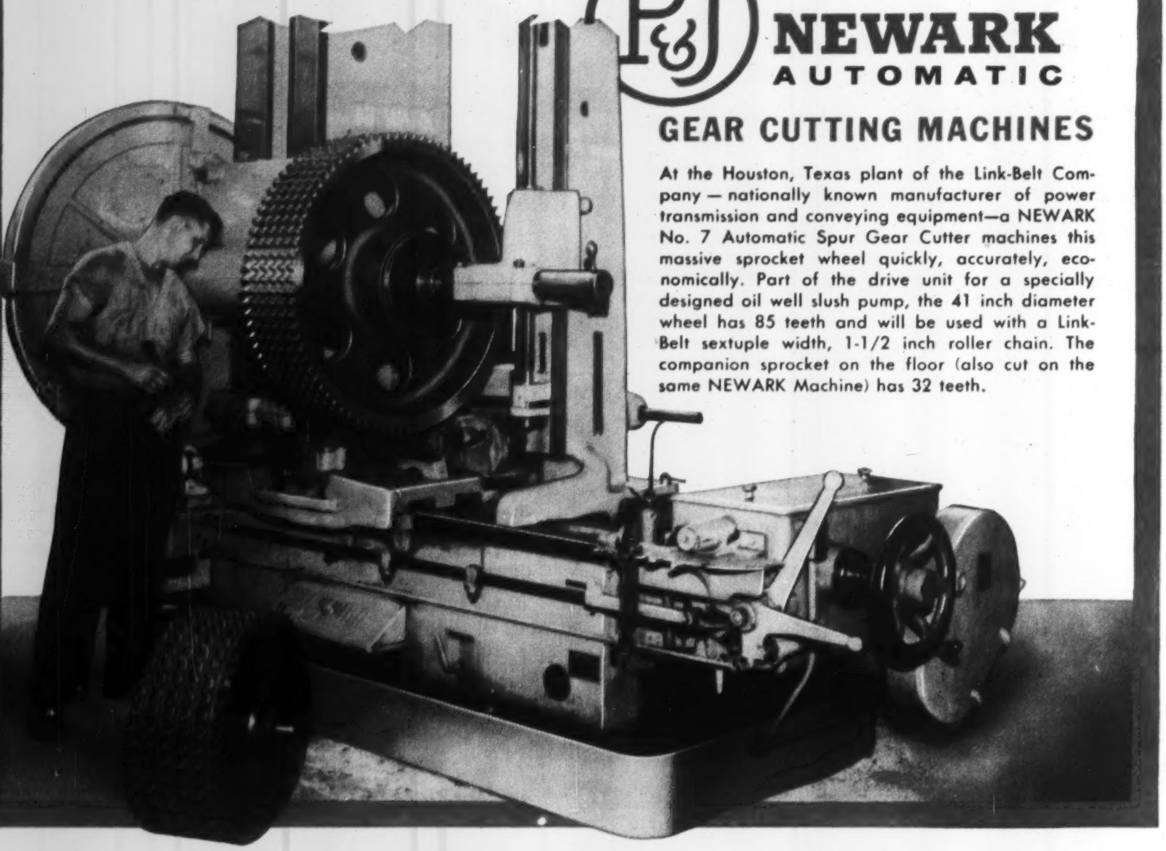
## GEAR CUTTING MACHINES



**At the Houston, Texas plant of the Link-Belt Company — nationally known manufacturer of power transmission and conveying equipment—a NEWARK No. 7 Automatic Spur Gear Cutter machines this massive sprocket wheel quickly, accurately, economically. Part of the drive unit for a specially designed oil well slush pump, the 41 inch diameter wheel has 85 teeth and will be used with a Link-Belt sextuple width, 1-1/2 inch roller chain. The companion sprocket on the floor (also cut on the same NEWARK Machine) has 32 teeth.**

When selecting a gear cutting machine, specialists who demand the ultimate in fast, accurate, economical production, look for important features like these: fully automatic operation; quick, simple machine setup; extra strength, power and rigidity; and an indexing mechanism *guaranteed* for accuracy. That's the reason specialists, like Link-Belt, who *know* the difference, depend on P&J-Newark Automatic Gear Cutting Machines for their big, tough jobs.

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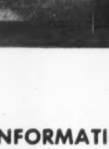

**Potter & Johnston Company,**
**Pawtucket, Rhode Island**
**(Subsidiary of Pratt & Whitney Company, Inc.)**

## POTTER & JOHNSTON

*Precision Production Tooling for More Than Fifty Years*

**AUTOMATIC CHUCKING TURRET LATHES • NEWARK GEAR CUTTING MACHINES**

# To Process Titanium

## TMCA is converting Toronto, O., steel plant facilities to roll and forge the metal

THE NATION'S first titanium processing plant will be established in Toronto, O., by Titanium Metals Corp. of America, New York. Up to now, steel mills have been converting ingots into mill products (sheet, strip, billet and bar).

The rolling and forging facility will go into the Ohio River Steel Division plant of Louis Berkman Co., which TMCA is purchasing. It will handle the more demanding high strength alloy products.

**Growing**—TMCA, which is jointly owned by National Lead Co. and Allegheny Ludlum Steel Corp., is expanding the annual capacity of its Henderson, Nev., titanium sponge plant from 6000 to 9000 tons. Ingot capacity will be boosted to 11,000 tons annually, an 80 per cent increase.

Early this year the firm purchased a $3-million Sendzimir cold-rolling mill for the continuous processing of 48-in. sheets.

**Production** — The first items from the Toronto plant will be special forged billets for jet engine wheels and heat-treated alloy sheet for advanced jet fighters, bombers and ballistic missiles.

Special rolling mills and TMCA-designed vacuum annealing furnaces and heat-treating equipment are in the design or construction stage for the new plant. They will cost about $8 million.

Annual consumption of titanium mill products is expected to hit 15,000 tons in 1958. In 1955, the figure was less than 2000 tons.

Important in the stimulation of increased usage of the metal has been a series of price reductions and improvements in quality to meet the exacting technical requirements of jet aircraft, engines and ballistic missiles.

### Brandes Press Co. To Build

Brandes Press Co., Cleveland, will build a plant in Lake City, Pa., near Erie, which will manufacture automatic metal stamping presses and related products. An affiliated company, Lehmann-Brandes Machine Co., will continue to make lathes and special machinery in St. Louis.

### Forms By-Products Division

To develop a broader market for by-products from its extensive metallurgical operations, Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., has set up a By-Products Division within its sales department. It will handle by-products resulting from the production of ferroalloys, metals and calcium carbide. P. J. Stefik Jr. is the division manager.

### Bearing Manufacturer Expands

General Bearing Co. Inc., Mineola, N. Y., expanded its facilities for the manufacture of commercial ball bearings and related items.

### Luria Opens District Office

Luria Engineering Co., Bethlehem, Pa., opened a district office at 1 Cedar Blvd., Pittsburgh, Pa. Eric N. Dittig is manager.

### Republic Buys Pipe Equipment

Republic Steel Corp. will install equipment for the manufacture of plastic pipe at its Plastic Products Division plant in Magnolia, Ark. Irrigation and line pipe up to 8 in. in diameter will be made.

### J&L To Build Warehouse

Jones & Laughlin Steel Corp., Pittsburgh, will build a warehouse on Preston highway in Louisville. Initially, it will have 100,000 sq ft of floor area. Inventories of structurals, plates, hot-rolled bars and cold-finished steel bars will be carried. A flat-rolled coil and sheet department will be added. Facilities for slitting, shearing and processing will be installed.

### Federated Offers Pellet Lead

American Smelting & Refining Co.'s Federated Metals Division New York, has started production of pellet lead at its Perth Amboy, N. J., plant. This product is used to impart valuable properties to steel, including improved machining and heat treating qualities.

### Texas Gets Another Can Plant

American Can Co., New York, will construct a plant at San Antonio, Tex. The 115,000 sq-ft facility will have the capacity to produce 275 million cans a year for beer and food products. The company formally opened its new plant at Arlington, Tex., last month. It contains more than 180,000 sq ft of floor area and can turn out more than 1 million containers a day.

### Blakeslee Mfg. Changes Status

Vac-U-Lift Co. is the new name of the Blakeslee Mfg. Co., Salem, Ill. The maker of a material handling unit also announces its association with Hufford Machine Works Inc., El Segundo, Calif., of which it has become a division.

### Dravo Gets Mesta Contract

Dravo Corp., Pittsburgh, was awarded a contract for two Dravo-DeLaval mill lubrication systems by Mesta Machine Co., that city. They will be installed on a single skin pass mill being designed and built by Mesta for a steel producer.

### Will Expand Mercer Pipe Plant

Sawhill Tubular Products Inc., Sharon, Pa., has negotiated a $3.5-million loan to finance expansion at its Mercer Pipe Division.

### GE Plans Another Laboratory

General Electric Co.'s Medium Induction Motor Department, Schenectady, N. Y., will invest $1.5 million in a developmental laboratory in that city. Its purpose: The creation of new products and improvement of present lines.

### Ford Orders 14 Furnaces

Ford Motor Co., Dearborn, Mich., awarded contracts for 14 field-erected aluminum reverberatory-type furnaces to Lindberg Industrial Corp., Chicago. They will handle the contemplated annual requirements of 64 million lb of aluminum at the company's permanent mold and die-casting plant at Sheffield, Ala. The majority of the furnaces will have a holding capacity of 65,000 lb of molten

# to feed the hungry

## "Food" for steel is abundant in the Land of Plenty

In this mineral-rich territory is a virtually inexhaustible source of superior Bituminous Coal, vast deposits of top-grade limestone and plenty of industrial water. Ore can be transported economically from the strategically located Port of Norfolk on Hampton Roads.

There's also excellent power and an adequate force of friendly, dependable workers.

Considering these major production advantages — plus the availability of many fine industrial building sites — we believe the Land of Plenty is an ideal location for the successful operation of a steel mill.

THE Land of Plenty
THE SIX GREAT STATES SERVED BY THE NORFOLK AND WESTERN
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MARYLAND
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KENTUCKY
VIRGINIA
NORTH CAROLINA

Recent scientific studies have revealed some impressive facts about the Land of Plenty in regard to its advantages for the steel industry. We invite you to contact our plant location specialists for detailed information, which will be furnished in confidence and without obligation.

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**WATER** — Excellent plant sites are available adjacent to the water you need. The supply is adequate for the needs of a steel mill of any logically conceivable size.

**ORE** — The short haul from the big modern Port of Norfolk to your production site will save you time and money in the overland transportation of iron ore and other needed mineral imports.

**LIMESTONE** — At easily accessible points along the N&W there are newly discovered deposits of limestone of almost unbelievable purity. These deposits contain more than 100 million tons in minable beds of over 100 feet in thickness.

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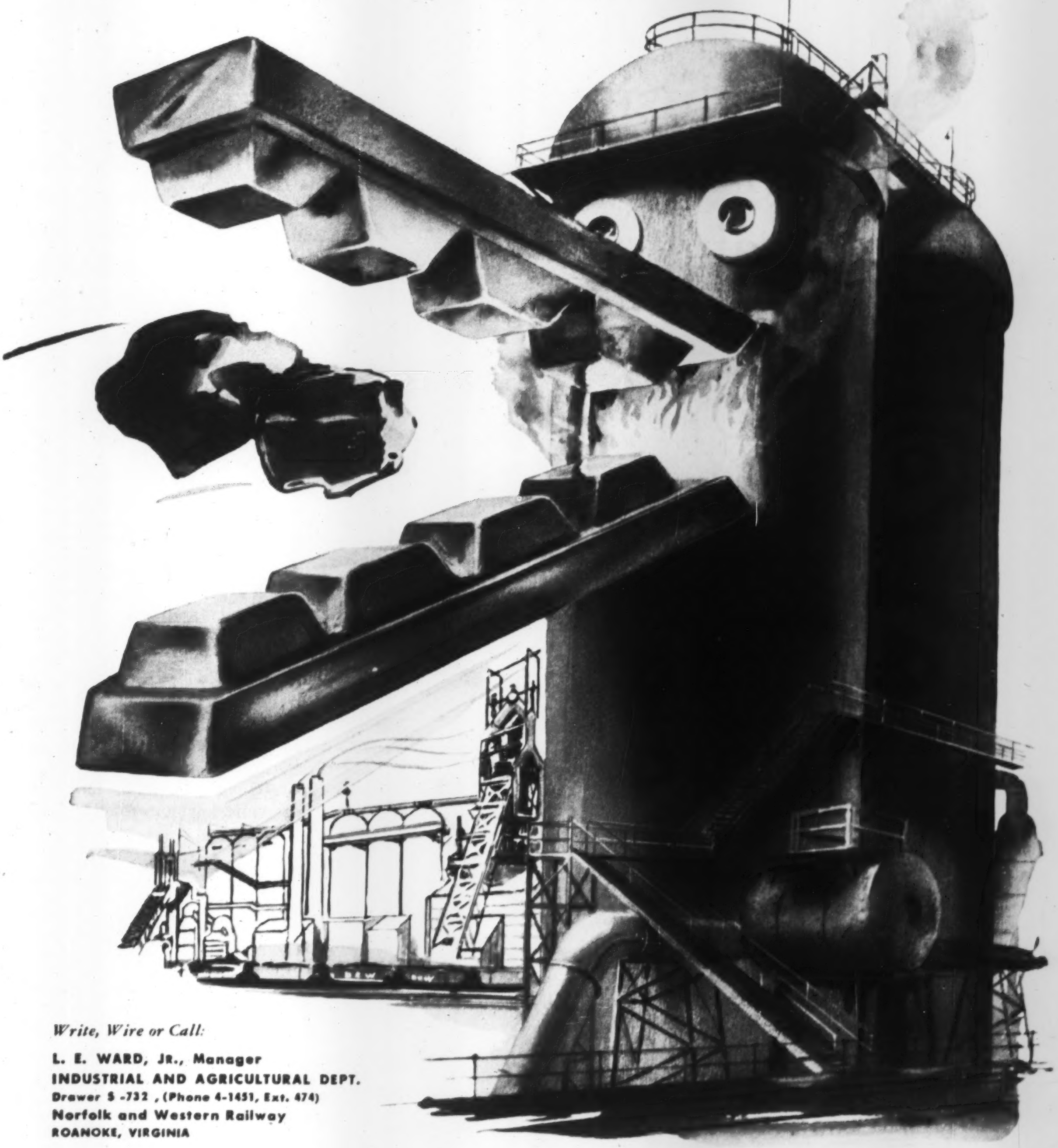

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Photo courtesy Pacific Tube Company, Los Angeles

Now, available L.P.G.—diesel or
gasoline-electric powered in capacities
from 2 to 15 tons. Available on
long term lease arrangement, too.

aluminum, which will be received in mobile carriers from the nearby Reynolds primary metal plant.

### Builds Steel Strapping Plant

A. J. Gerrard & Co., Melrose Park, Ill., is building a $60,000 plant at Leeds, Ala. It'll produce steel strapping, seals, cotton bale ties and other industrial packaging equipment.

### Plans Copper Tubing Factory

Canada Vulcanizer & Equipment Co. will erect an $8-million factory at London, Ont., for the production of copper tubing. Building costs alone are estimated at $3 million.

### AMF Plans Research Center

American Machine & Foundry Co., New York, will build a research and development center in Stamford, Conn., as headquarters for its Central Engineering Laboratories. Cost: About $4 million.

### Standard Register To Build

Standard Register Co., Dayton, O., plans to build a $1-million manufacturing facility at Fayetteville, Ark. Construction of the first unit containing about 64,000 sq ft will be completed by mid-1957. As materials and equipment become available, the plant will be expanded to 120,000 sq ft. When in full operation, it will make most of the company's line of business machines and business forms.

### McJunkin Opens Sales Office

McJunkin Corp., Charleston, W. Va., opened its new branch sales office at 2 Gateway Center, Pittsburgh, Pa. The firm is a distributor of industrial supplies, tubular goods and stainless steel products. W. H. Beegle is district sales manager.

## NEW ADDRESSES

**American Brass Co.** opened its new warehouse at 2200 W. 117th St., Cleveland. The facility has 30,000 sq ft of floor space and is equipped with power tools to serv-

**SIMONDS**
**ABRASIVE CO.**

# Nut or bolt inserted ABRASIVE DISCS *for faster production*

Made by an outstanding grinding wheel manufacturer expressly for use on Besly, Gardner, Hanchett and similar grinders . . . furnished in grain and grade specifications specially engineered to give better, faster production . . . available in all sizes to fit all grinders, back plates and bolt hole layouts . . . supplied plain or perforated, solid or sectional, for use singly or in pairs. Only usable abrasive charged for. Send for Bulletin ESA 54.

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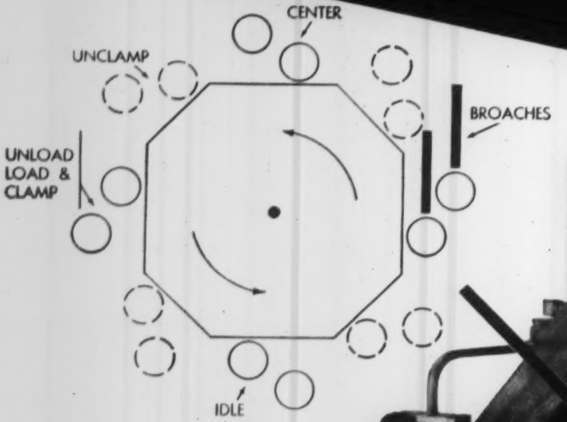
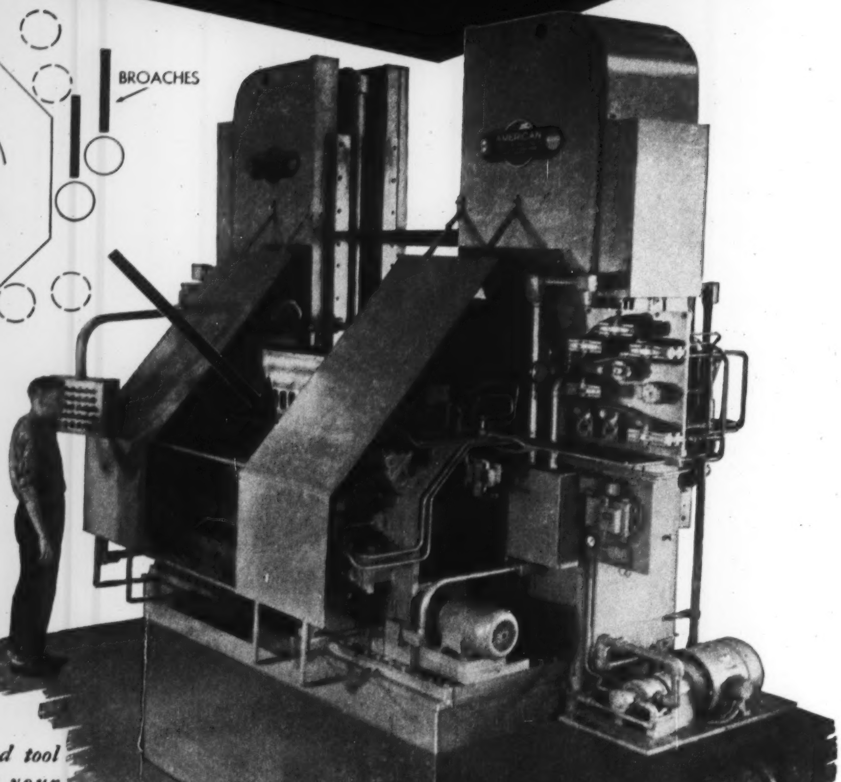
ANOTHER *American* FIRST

## BROACH SHAFT ENDS
## SLOT FLANGE ENDS
## CENTER DRILL
## BOTH ENDS

*2 axle shafts every 30 seconds*

Axle shafts of two different lengths are simultaneously broached at both ends and then center drilled on this American double column broaching machine. With a 30-second cycle, including 8 seconds for unloading and reloading by the operator, a production rate of 240 parts per hour is made possible.





**A major tooling feature is an 8-position, drum-type indexing unit, equipped with four 2-station work holding fixtures. With the machine operating on the automatic cycle, operator reloads while broaching and center drilling is in progress at the other stations.**

***For the top-notch machine and tool engineering that will cut your broaching costs, contact American. American's Catalog 450 is yours for the asking.***

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A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

SUNDSTRAND

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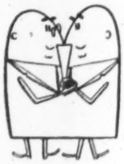
ice copper and copper-alloy orders which require sawing, shearing or slitting. Harry M. Paxson is the district sales manager of this subsidiary of Anaconda Co.

**Landis Tool Co.,** Waynesboro, Pa., manufacturer of universal, plain, roll and special purpose grinders, moved its Cleveland branch office to the Penton Bldg., 1213 W. Third St., Cleveland 13, O.

**Baker-Raulang Co.,** Cleveland, moved its Dallas branch office to 1703 Levee St., Dallas 7, Tex. The firm also announced the appointment of M. S. Stevenson as manager of the branch.



## CONSOLIDATIONS

**American Pulley Co.,** Philadelphia, purchased the **Materials-Handling Division** of Market Forge Co., Everett, Mass. The division's products include power trucks, hand-operated pallet and lift trucks, gravity conveyors and special material handling equipment.

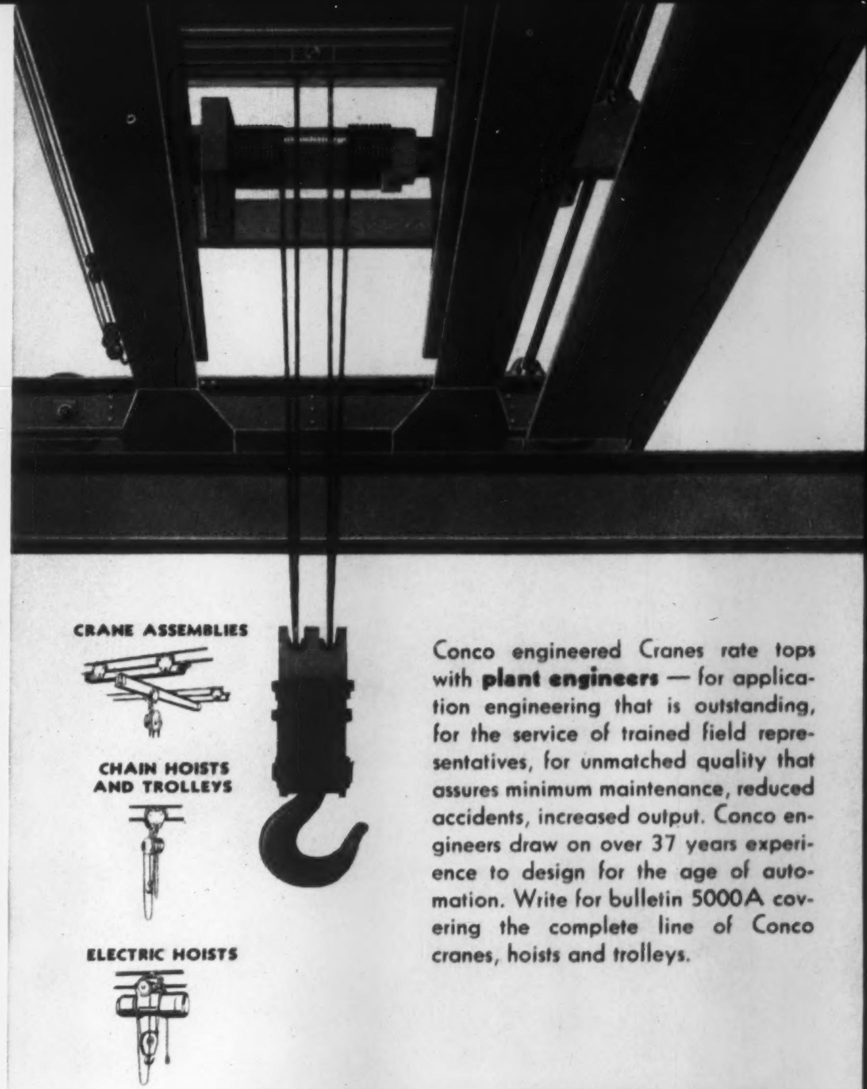
**Electric Storage Battery Co.,** Philadelphia, acquired the fixed assets of **Dibb Mfg. Co. Inc.,** Robbinsdale (Minneapolis), Minn. They will be absorbed into Electric Storage's Jordan Electric Products Division, Minneapolis. Dibb supplied Jordan with sheet metal housings and other components.

**Strategic-Udy Processes Inc.,** a subsidiary of Strategic Materials Corp., Buffalo, acquired the Niagara Falls, N. Y., laboratory and business of Comstock & Wescott Inc., Cambridge, Mass.

**Caspers Tin Plate Co.** acquired **Olive Can Co.,** both of Chicago. Olive Can makes lithographed cans for packing candy, cakes, specialty foods and other products.

**Wedgelock Corp.,** North Hollywood, Calif., has been formed by consolidating the original **Wedgelock Co.** and its divisions: **Wedco Screw Products Co.** and **Finkle Realty Co.** The company makes aircraft sheet metal fasteners and aircraft tools. Officers are: G. H.

(*Please turn to page* 102)



Conco engineered Cranes rate tops with **plant engineers** — for application engineering that is outstanding, for the service of trained field representatives, for unmatched quality that assures minimum maintenance, reduced accidents, increased output. Conco engineers draw on over 37 years experience to design for the age of automation. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.

FROM ANY VIEWPOINT

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**CONCO ENGINEERING WORKS**

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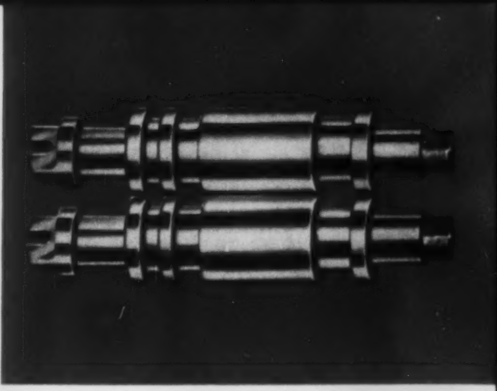
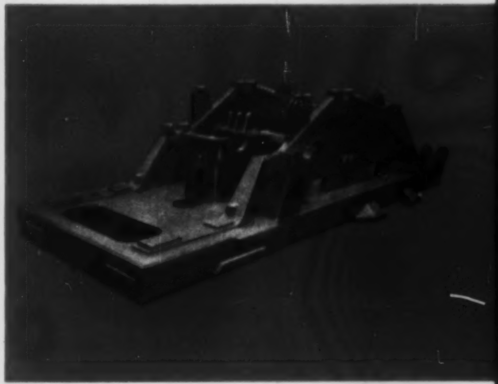
**CONTINENTAL** 40-inch, 2-high reversing blooming-slabbing mill in the Fairless Works of the United States Steel Corporation.



**ROLLS**—iron, alloy iron and steel rolls for all types of rolling mills.

**CASTINGS**—carbon and alloy steel castings from 20 to 250,000 pounds.



**WELDMENTS**—fabricated steel plate, or cast-weld design.

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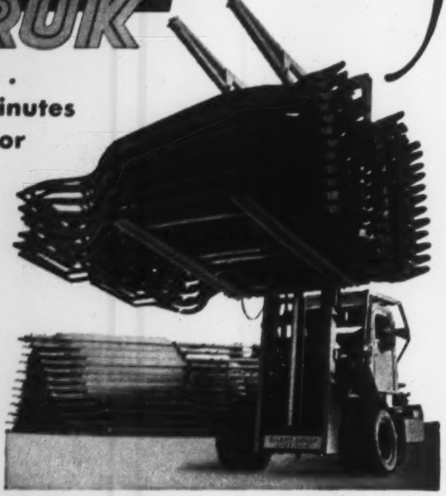

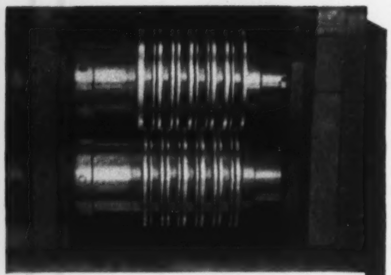

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(*Concluded from page 99*)

Finkle, president and general manager; Mel Kruger, vice president in charge of product sales and engineering; L. C. Finkle, vice president in charge of contract sales; D. A. Hendricks, vice president in charge of manufacturing; W. A. Trumbo, treasurer and assistant secretary; R. J. Fay, secretary and assistant treasurer and controller.

## ASSOCIATIONS

**American Machine Tool Distributors' Association,** Philadelphia, elected these officers: President, J. F. Owens Jr., J. F. Owens Machinery Co., Syracuse, N. Y.; vice president, F. H. Habicht, Marshall & Huschart Machinery Co., Chicago; second vice president, J. O. Ellison, Harron, Rickard & McCone Co. of Northern California, San Francisco; secretary-treasurer, J. Russell Clark, White Star Machinery & Supply Co., Wichita, Kans.

**Service Tools Institute,** New York, elected: President, E. J. Muldoon, Hand Tools Division, New Britain Machine Co., New Britain, Conn.; vice president, R. J. Ahern, Billings & Spencer Co., Hartford, Conn., and Peck, Stow & Wilcox Co., Southington, Conn.

**Metal Treating Institute,** New Rochelle, N. Y., elected these officers: President, H. N. Bosworth, Bosworth Steel Treating Co., Detroit; vice president, K. U. Jenks, Lindberg Steel Treating Co. Inc., Melrose Park, Ill.; treasurer, L. G. Field, Greenman Steel Treating Co., Worcester, Mass.

H. B. Duffus, administrator of accident prevention for Westinghouse Electric Corp., has been installed as president of the **American Society of Safety Engineers,** Chicago. Other officers are: First vice president, John F. Juli, Consolidated Western Steel Division, U.S. Steel Corp., Los Angeles; second vice president, Robert Clair, Liberty Mutual Insurance Co., Boston; treasurer, G. F. Neurnberger, A. B. Dick Co., Chicago; and secretary, J. B. Johnson, managing director of the society.

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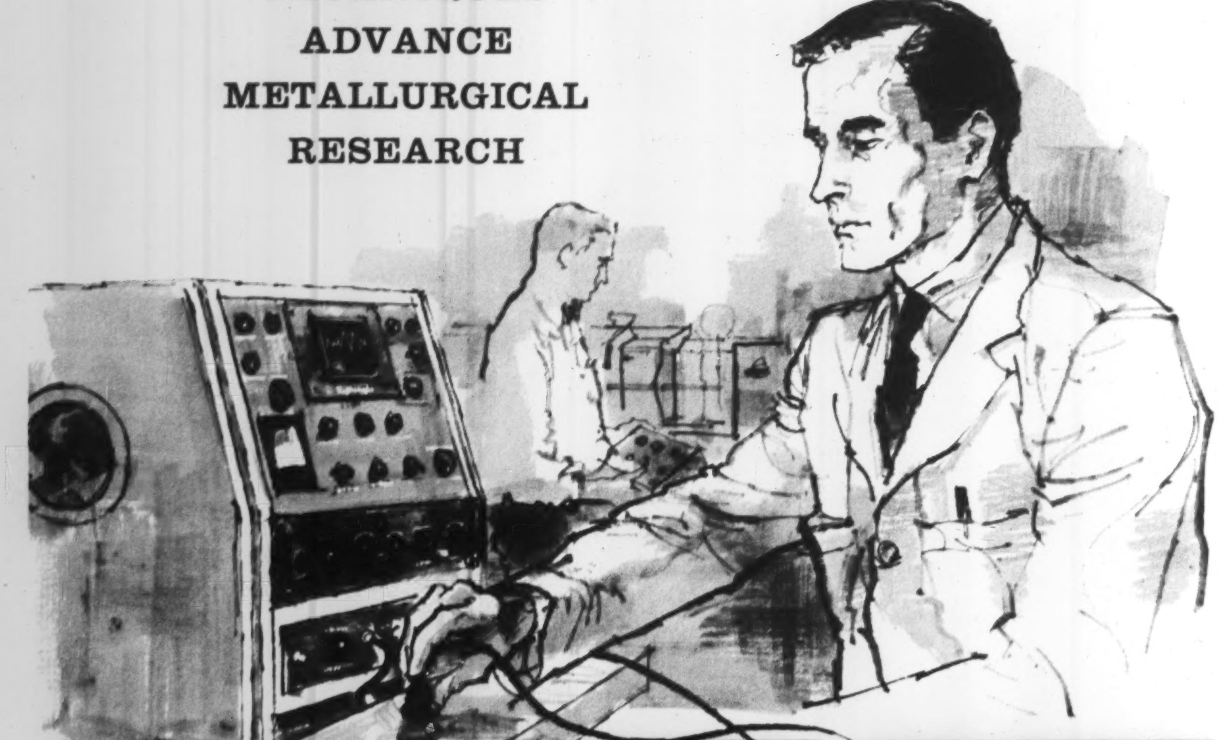
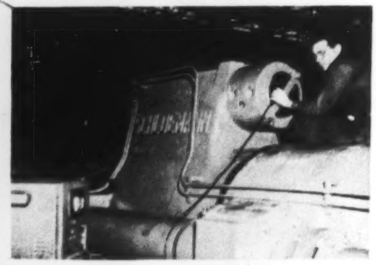
# HOW MODERN INSPECTION TECHNIQUES ADVANCE METALLURGICAL RESEARCH



*Automatic Ultrasonic Inspection of continuously produced steel strip and welded tube is one of the most recent Reflectoscope inspection techniques brought from laboratory to production line.*



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STEEL

November 5, 1956

# Technical Outlook

**TRUE—** STEEL's report (Sept. 3, p. 77) about Linde Air Products' radically improved system for hand welding has been confirmed. Called Unionarc, it'll be shown in Philadelphia at next April's welding show. Claims: Semiautomatic precision welds in all positions; you don't have to change equipment or controls to go from flat to vertical to overhead; it's not sensitive to rust or poor fitup.

**TAPE CUTTING—** William C. Stolk, president of American Can Co., got the joint Military-Industry Packaging & Material Handling Symposium off to a running start with a plea for less rigid specifications on procurement items "to take quicker advantage of the technological fruits of our competitive economy." Government and industry, he charged, "are hamstrung by iron-clad specifications that make it almost impossible to change the accepted way of making military procurement items without an endless unraveling of red tape."

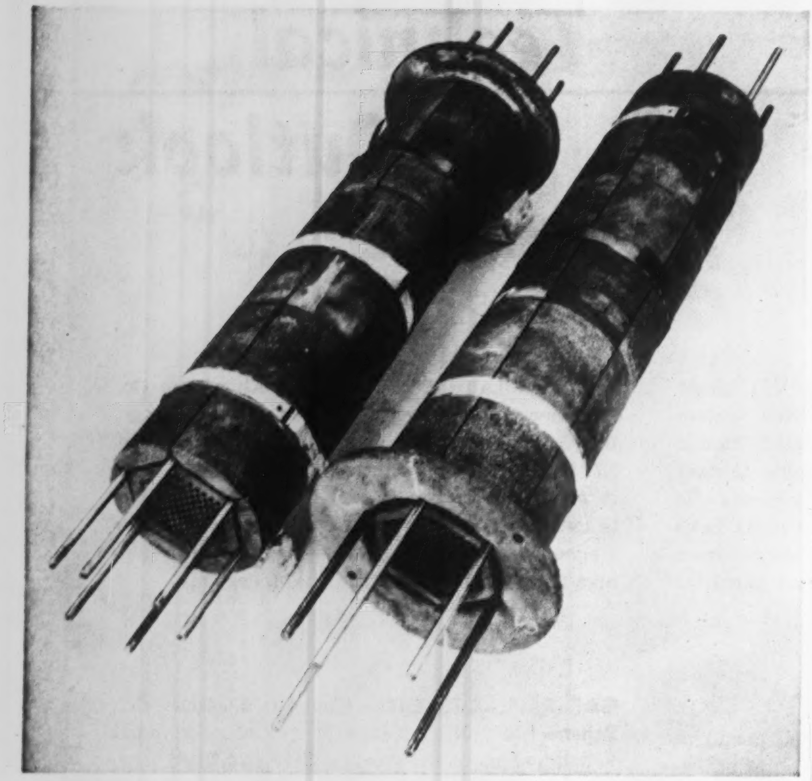
**PLASTIC STEEL—** A cold repair compound (80 per cent steel, 20 per cent plastic) hardens in 2 hours. You can saw, drill, thread or grind it with metalworking tools. It was used to repair the cylinder of a 3000-ton hydraulic press at Chrysler Corp., Detroit. Reported savings: $25,000 and 60 days of production. It's made by Devcon Inc., Danvers, Mass.

**LOW-STRESS TEMPER—** A new tempering process produces aluminum alloy hand forgings with a low level of internal stress that sharply reduces machining and straightening time. Designated T65 temper by Aluminum Co. of America, the treatment has been used on alloy X7079. A machined hand forging of X7079-T65 shows about the same warpage found in stretched plate and extrusions. Alcoa hopes to extend the advantages of T65 temper to other alloys. Work aimed at stress-relieving die forgings with the new treatment is under way.

**GAS REPLACES OIL—** General Electric Co., Schenectady, N. Y., says it has shipped what it believes to be the world's first gas filled power transformer. Rated at 2000 kilovolt amperes, it is cooled by sulphur hexafluoride gas instead of oil. Advantages claimed: It's lighter, safer and quieter than other transformers.

**FINE MOLD—** Nozzle rings for diesel engine turbosuperchargers are cast within 0.010 in. by the Almold process. Vanes of type 321 stainless are inserted in the mold and type 410 is cast around the bases. The method was developed by the Allegheny Ludlum Steel Corp., Pittsburgh.

**PACKING CHECK—** Don't switch to fire-resistant hydraulic fluids without running a check on packings. Some combinations of packings and fluids are incompatible. A study by E. F. Houghton & Co., Philadelphia, shows that rubber-impregnated, leather packings work best with all fluid types. Changing from a mineral oil to a water-base fluid gives no trouble, say Houghton experts. Packings made from a buna N polymer swell when they are exposed to phosphate ester fluids. Butyl rubber will handle them, so will impregnated leather.



*These high temperature heat exchangers fabricated from impervious silicon carbide point to . . .*

# A Material with a Big Future

### Nine Facts About Silicon Carbide

1. **Extreme hardness—only boron carbide and diamonds are harder.**
2. **Good wear and abrasion resistance—much better than metals.**
3. **Strength and stability to 3000°F.**
4. **Inert to acids and many other corrodents.**
5. **Electrical semiconductivity and rectifying properties.**
6. **Low neutron adsorption.**
7. **High thermal conductivity.**
8. **Low density—less than one-half that of steel.**
9. **High thermal electromotive force when paired with graphite.**

WE'VE only scratched the surface in the use of silicon carbide as a material for parts that must stand extreme service conditions, G. M. Butler, manager, engineering research branch, Carborundum Co., Niagara Falls, N. Y. recently told the Electrochemical Society at Cleveland.

Silicon carbide superrefractories are being formulated for extreme resistance to deformation, corrosion and other destructive effects of service at extremely high temperatures, he reported.

**Start** — For some years, parts have been made by bonding silicon carbide with mixtures of minerals and clays which produce a silicate bond during firing. They are used as kiln furniture, muffles and hearths for furnaces, skid rails in billet furnaces, retorts and condensers in zinc refining and linings for blast furnaces.

But the softening point of the silicate bond imposes a limit upon the temperature which these refractories can stand. New and more severe demands have pushed them to their limits. It became evident, said Dr. Butler, that the full potentialities of silicon carbide could be realized only with improved bonding methods.

The breakthrough came when a new silicon carbide-silicon nitride material (Niafrax) proved to be an "outstanding success" as a nozzle and combustion liner for rockets.

**Higher Limits** — The silicon nitride bond in this composition does not melt up to its dissociation point of 3450°F and retains useful strength at even higher temperatures.

Various modifications of this superrefractory started to take on jobs formerly done only by metals —such as jigs which hold jet engine parts during furnace brazing. The refractory eliminated the distortion of cast alloy jigs.

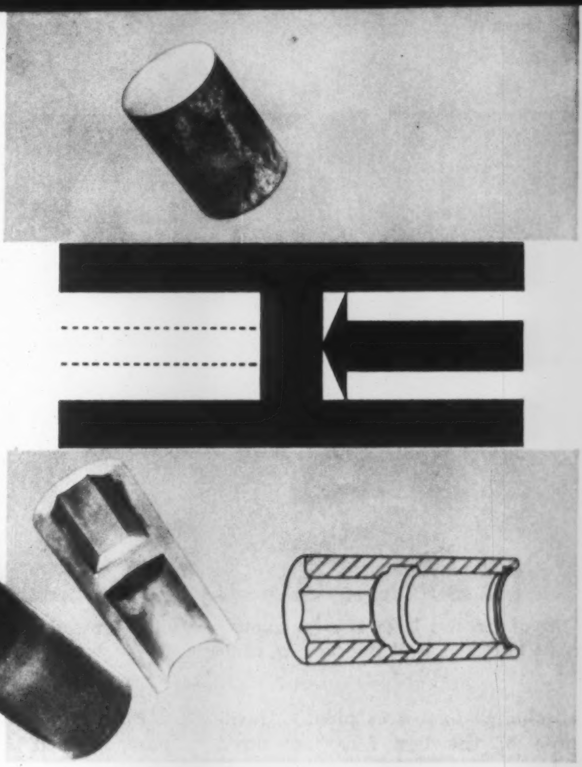
**New Horizons** — Although the material was an improvement over conventional silicon carbide refractories, the bonding agent still had less resistance than silicon carbide itself. Another disadvantage was that it could not be made impermeable to gases and liquids.

Researchers started to dream about a self-bonded silicon carbide. Tests revealed that such a product could be made by hot pressing fine silicon carbide grains at high temperature and pressure.

Dr. Butler stated that this new material (named KT silicon carbide after its inventor, Kenneth Taylor) is impervious to gases and liquids. It has great strength at high temperatures. It shows better thermal conductivity at high temperatures than other ceramics and exceeds most metallic heat resisting alloys in this respect.

Some potential uses of impervious silicon carbide being investigated: 1. Valves and piping for corrosive and erosive materials. 2. Pumps and parts for handling molten aluminum. 3. Sandblast nozzles. 4. Rocket nozzles. 5. Fuel elements and structural members going into gas cooled nuclear reactors. 6. Thermocouple protection tubes. 7. Heat exchangers.

It's sweeping into the automotive,
construction equipment, aircraft
and electrical fields.
New presses and improved techniques
herald a long run



**production ideas**
NO. 5 OF A SERIES

# Cold Extrusion Tools Up for Production

THE TORSION bar anchor housing in the illustration was cold extruded from 1035 steel in one 365-ton push.

At the top of the page is the billet, about 3 in. long. At lower left is the extruded blank, about 5 in. long, and a cutaway view. At lower right is a cutaway drawing of the part after machining.

Pressed Metals of America, Port Huron, Mich., is making the part on two new presses built by Lake Erie Engineering Corp., Buffalo. A. O. Smith Co., Milwaukee, will weld it into the front crossmember of an auto frame, and you'll see it on the new Chrysler Corp. cars.

**Progress** — Cold extrusion was brought to this country from wartime Germany. Originally a shell-making process, it has come a long way. The automotive industry, quick to realize its advantages, promises to become one of its biggest users.

Says G. R. Fitzgerald, director of process development at General Motors Corp.'s Technical Center: "As the cost of material increases, cold extrusion will become more and more economical. There are many areas where the economy of moving metal, rather than removing it, is sufficient to dictate the purchase of new equipment."

**Plusses**—Cold extrusion has five big advantages, explains J. F. Leland of Parker Rust-Proof Co., Detroit. The torsion bar housing embodies all of them.

1. Less expensive raw materials: Because of the cold working involved, low carbon steel can be used for parts requiring physicals obtainable only with high alloy steels.

2. Savings in raw materials through reduction in scrap: Nearly every ounce of metal in the original slug is present in the final product. Although some parts are made from slugs blanked from hot-rolled plate, additional scrap savings (up to 30 per cent) can be realized by using slugs sawed from hot-rolled bar stock.

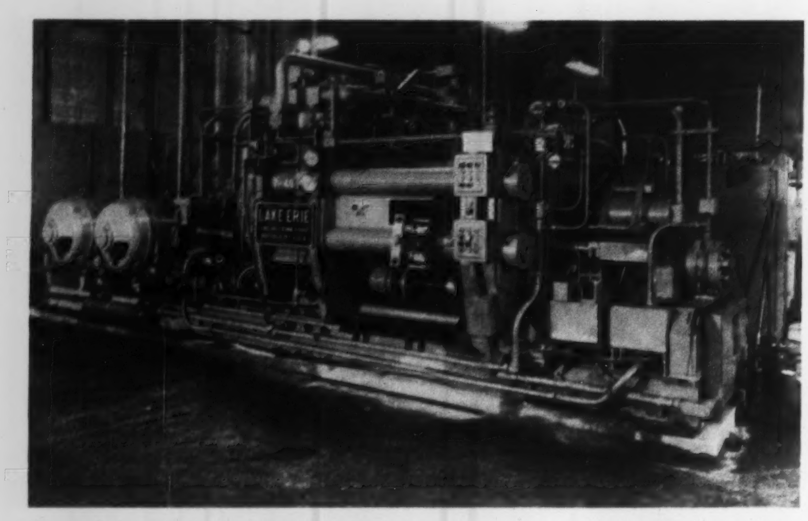
3. Improved physicals in the final part: Compared with parts produced by machining, cold extruded parts often can be made stronger and of smaller section because the metal flow follows the contours of the part.

4. Less finish machining: Cold extruded parts can be worked to such close tolerances that little trimming or machining is required.

5. Cost savings through reduced operations: The amount of cold work which can be done in one operation and the small amount of machining required mean fewer operations are needed to make the part. Higher production and reduced labor costs generally will result.

**Housing**—By cold extruding the torsion bar housing, Pressed Metals uses only about 60 per cent as much metal is it would take to make it on a screw machine.

The sides of the hex hole in the part take a beating in service; they hold the torsion bar. When this part is made from 1035 steel on a screw machine, it is necessary to harden it to get the required physicals. Cold extruding the part



One of the two Lake Erie horizontal extrusion presses. Hydraulic accumulator is at left, dies and punches at center

eliminates heat treatment. Hardness of the hex face, measured 0.50 in. from the outer end, is Rockwell C25.

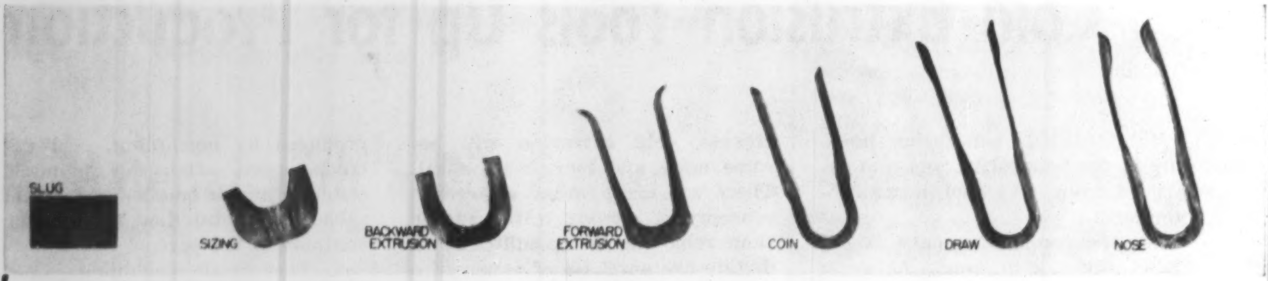
**Finishing**—To make the finished part, Pressed Metals drills out the web between the holes, makes an undercut on the inner diameter and machines the end with the round hole to take a seal (see sketch of finished part). The operations are done on drill presses and automatic chuckers.

The round hole is held to 0.003 in. in the extrusion operation. If the hole were machined, it would require a reaming operation to get the tolerance and surface finish required.

**Press**—Lake Erie's horizontal extrusion press has a five-station dial feed. It is rated at 484 tons of pressure, 440 for extruding and 44 for ejecting the finished piece. (The housing requires only 365 tons to extrude.)

Dies are mounted in the indexing dial. The hexagon punch is fixed to the end platen; the round punch and ejection punch are mounted on hydraulic rams.

**Indexing** — The dial has two movements—axial and rotary. (It is necessary to move the dial axially to clear the fixed punch during



Gibson Refrigerator Co. cold formed the 75-mm shell in six operations

## Modified Shell-Making Method Has Fewer Operations

A MODIFICATION in the sequence of cold extrusion operations used to make 75-mm shells and similar products promises savings in material and labor.

It was developed by Hubert J. Pessl, consulting metallurgist, while he was with Gibson Refrigerator Co., Greenville, Mich.

That company recently completed a contract for about 1.75 million shells, which was terminated before the new process could be tried in production, but experimental extrusions have proved the method, says Dr. Pessl.

**Standard Method**—Gibson's shellmaking process is a modification of the method developed by Heintz Mfg. Co., Philadelphia. It starts with a billet (slug) 4 in. in diameter which is reduced to a shell with less than 3 in. OD.

The main purpose of the larger slug, explains Dr. Pessl, is to provide sufficient cold working to get the physicals required by ordnance specifications. Forming operations are sizing, backward extrusion, forward extrusion, coining, drawing and nosing.

**Modification**—By starting with a 3¼ or 3½-in. billet, you can replace the sizing, backward and forward extrusion operations with two backward extrusions, states Dr. Pessl.

A worn-out coining bushing and a discarded coining punch with a broken tip were adapted for the experimental backward extrusion.

**Operation**—Seven billets were prepared from shell quality bar steel which was 4 in. in diameter. They were turned down to 3¼-in. in diameter and sectioned into 3⅛ to 3⅞-in. lengths. After surface coating (phosphate and soap), they were backward extruded in the experimental die which was indexing.) A hydraulic motor with a positive stop rotates the dial through 72 degrees for each indexing movement. A hydraulic cylinder moves the dial axially.

After indexing, the hydraulic cylinder moves the dial back into extruding position. The die in the dial engages a pilot on the hex punch to locate it accurately.

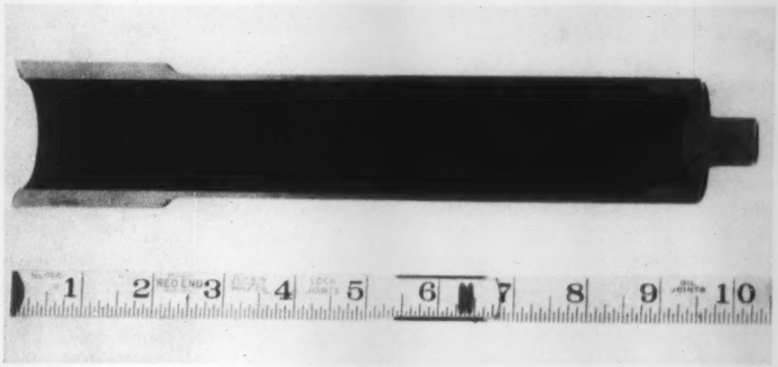
**Operation**—Billets to be extruded are coated with a heavy, uniform coating of a phosphate and soap lubricant developed by Pennsylvania Salt Mfg. Co., Philadelphia. Nonuniform coatings of the lubricant can cause metal pickup on the punches and scoring of the dies, or eccentric extrusions.

With billets in the loading chute, depressing the "cycle start" button loads a billet into the dial. At time of loading, the dial is sealed against the end platen. After loading, the dial moves axially to its indexing position, indexes and moves back against the end platen. After indexing one position, the extrusion and ejection actions take place.

**Stripping** — The extrusion and ejection rams automatically return to the retracted position after completing their working strokes. At the return of the main ram, four stripper ram assemblies mounted within the main ram are actuated and strip the extruded piece from the moving punch.

Each time a billet is extruded, a new one is loaded into a dial station and an extruded billet is stripped from the die. If no billet is loaded, the press will stop.

If the third station, which



Hydraulic cylinder for aircraft. Originally made in three pieces, brazed and machined, the part now is cold extruded at a 30 per cent saving

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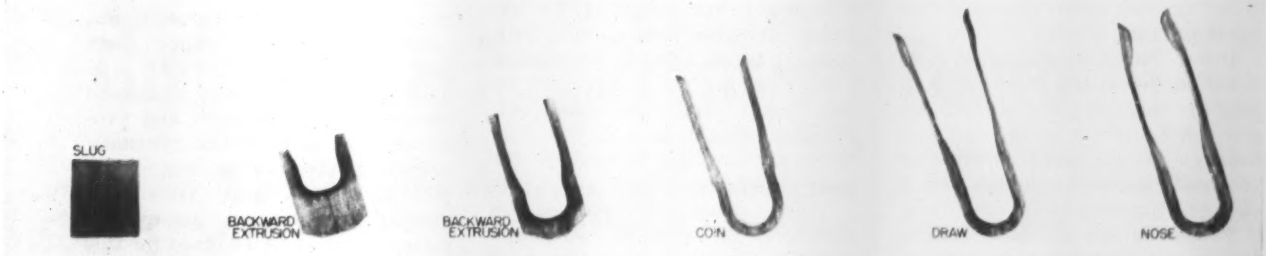


New process uses only five cold forming operations.

press fitted into the regular coining die-shrinking assembly of the 600-ton coining press.

Extrusion pressures ranged from 280 to 540 tons, increasing with the longer billets.

**Strengths**—Tensile specimens were taken from the seventh billet (3⅞-in. long) which was backward extruded, process annealed (850°F, ½-hour), surface coated and coined.

Average results in the as coined and stress relief annealed conditions were:

| | Required | As Coined | Stress Relieved |
|---|---|---|---|
| Yield (1000 psi) | 85.0 | 97.6 | 94 |
| Ultimate (1000 psi) | | 102 | 98 |
| Elongation (Per cent in 2 in. Gage Length) | 12 | 10 | 14 |
| Reduction of Area | 25 | 34 | 50 |

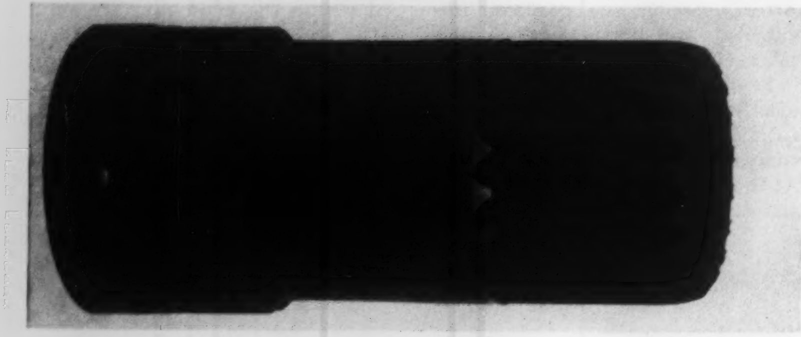
**Economies**—According to Dr. Pessl, the saw cut material loss, caused by sectioning the bar steel into billets, is reduced by more than one-third, due to the reduction in cross section. This equals about 2 cents per shell.

The trimming of the forward extrusion flange or press rest is eliminated. This amounts to about 1.8 cents per shell.

A time study estimate shows a saving of almost 10 per cent in labor costs—about 3 cents per shell.

**Equipment**—One press operation (sizing) and one cycle of the surface coating operation are eliminated. The other two 1500-ton presses used in the first three regular cold forming operations can be replaced by one 1000-ton and one 800-ton press for the two backward extrusions.

Summing up, Dr. Pessl explains: "Generally, in the cold forming of parts that lend themselves to this process, the diameter of the bar section or billet need not be any larger (in some cases it can be smaller) than the outside diameter of the finished product, if the required physical properties can be obtained."



Truck axle gear. Conventionally machined from a hot forging, this 7-in long gear can be cold extruded with a 20 per cent cost saving

serves as a malfunction control point, signals a punch has broken or a billet has not been extruded at the previous stroke of the ram, the press will stop.

**Time Saver**—If a die should become damaged near the end of a day's run, and it would be more desirable to finish at reduced production than to repair the die, a pin can be inserted in that dial station to keep it from loading. The pin also will keep the malfunction control from stopping the press on that station.

**Other Parts**—Lake Erie's new press is versatile. Production is limited only by the die holder size, configuration of the part and tonnage of the press. Switching to a different part requires only a change of tooling.

Pressed Metals has other jobs in the works for the new presses. Parts it has been making on bar machines may soon be cold extruded. Tooling development is under way.

**Expanding Field**—Heintz Mfg. Co., Philadelphia, a pioneer in cold extrusion in this country, is working on several new commercial applications for the automotive, construction equipment and electrical fields.

A typical part is a high strength, hydraulic cylinder for aircraft. It was made in three pieces—a tube and two end caps which were hot forged. The assembly was brazed, then machined and the bore finish honed. Starting materials weighed about 2¾-lb.

Heintz is making this piece from 1015 steel (see photo). The billet, which is cut from bar, weighs 2.2 lb. The part is finished to dimensions when it comes from the press; tolerance on the inside diameter is 0.002 in. Savings in material, labor and machining costs total 30 per cent, compared with those of the conventional manufacturing method.

**Cuts Costs**—A truck axle gear is being machined from a hot forging. Heintz is able to save its customer better than 20 per cent on the cost of making the gear by cold extruding it.

The gear starts as a billet of 8620 steel bar weighing 7.6 lb. After extrusion (see photo), both ends are faced, a forked groove and a relief aft of the longer gear on the small end are undercut. Finished weight is 4.55 lb. The teeth are surface carburized for wear resistance.

These gears are installed on equipment in the field. Although savings in material on this part are not as great as on others, a number of machining operations have been eliminated.

**Auto Part** — A preproduction part for automotive suspension on current models is being made from 1035 steel which is not heat treated. Using a billet weighing barely over 4 lb, the cold formed blank weighs 4 lb. The conventional method of making the part from bar stock on screw machines uses 7½-lb of steel which must be heat treated. A lesser amount of machining and labor time points to a 25 per cent saving.

An automotive transmission gear blank made from just over 4 lb of 4024 steel is cold formed to 3.9 lb. The piece is finished on the outer and inner diameters as it comes from the press except for cutting bevel gears and grinding a bearing surface. The hot forged blank at this stage weighs 5.9 lb.

**Electrical Part** — An electrical housing is conventionally turned out of solid bar on a screw machine in 13 operations. The stock, magnetic ingot iron, weighs 3 lb at the start.

It can be cold formed in three operations, starting with a 0.6 lb blank. After machining, the part weighs 0.5 lb. The customer says the cost of the extruded blank is about the same as the cost of the material used in conventional methods. Heintz estimates a 40 per cent saving.

These parts are in the medium size range and are well suited to present extrusion equipment. Larger items similar in type may yield even greater advantages because of the greater saving in materials. Smaller parts (less than 1½-in. in diameter) also may prove to be adaptable.

**Future**—John E. King of Heintz Mfg. sums up cold extrusion's future this way: "We have plenty of work ahead of us in developing the techniques to extrude shapes of all kinds, such as those on the gear piece, bosses on cupped items, tapered and conical walled parts and cam formation.

"Various other items similar to those already developed and produced, such as hydraulic cylinders, actuators, piston pins, compressor pistons, hollow gear pieces and cupped housings are among the future items to be designed for this technique, with its saving in material, labor and cost."

**Titanium**—This expensive metal soon may be extruded commercially. Battelle Memorial Institute, Columbus, O., has cold extruded two grades of unalloyed titanium. Billets 3 in. long and 1½-in. in diameter were forward extruded with reductions of 40, 50 and 60 per cent. The extruded bars showed uniform deformation and work hardening.

A fluorine coating combined with an oil-graphite-molybdenum disulphide lubricant prevented seizing in the die and produced a good surface finish. Working pressures were comparable to those used in extruding steel.

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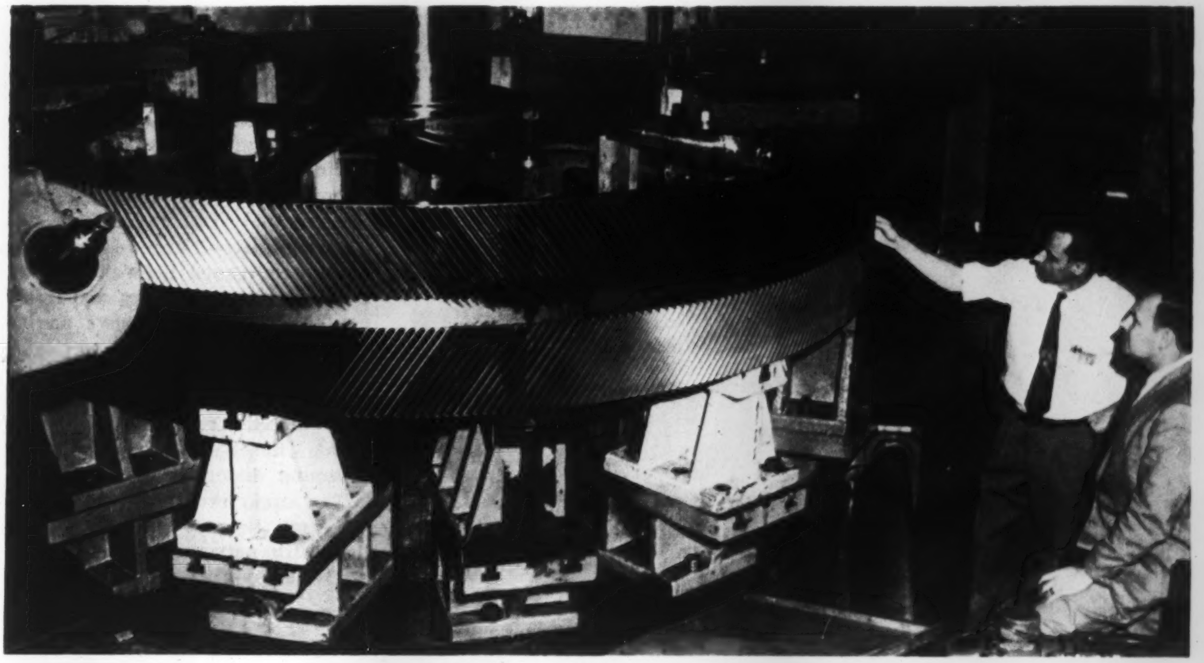
• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



Low-speed, 50,000-hp drive gear being cut to precise standards. Shaving smooths out many of the surface irregularities

# Giving Gears a Precision Touch

**For heavy loads or precision instruments, big and little gears need the same degree of accuracy. Here is how it's being done in a west coast plant**

ENGINEERS at Western Gear Corp. have three good reasons for thinking that gearmaking is more an art than a science:

1. Inspection won't guarantee that a gear will do its job adequately.
2. Tolerances don't depend on size but on the job a gear must do. (For heavy loads and fine instruments, 10 and 140-in. gears require the same precision.)
3. Velocity at the circumference, not revolutions per minute, is the most important factor in the meshing of gear teeth. (A 10-ft gear at 200 rpm must be as precise as a 1-ft gear at 2000 rpm.) Here's a look at gearmaking in this Lynwood, Calif., plant.

**Scope**—Most of the firm's precision gears are designed for high horsepower drives with low noise levels, or for instruments like those in guided missile controls.

Extensive laboratory facilities are needed for small precision gears. Large gears are inspected on special machines, or they are inspected during manufacturing. Western Gear uses machines for gears going into guided missiles.

High - horsepower drives are wide-face gears permanently fastened to shafts. Those for instruments or guided missiles are narrow faced and generally operate on a ball or roller bearing which is an integral part of the construction. Although their accuracy is comparable, they must be processed differently.

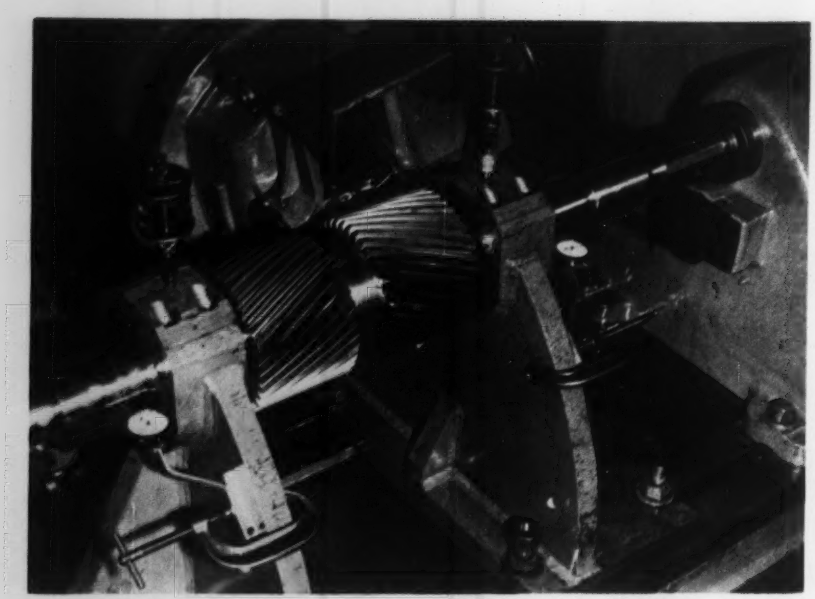
For high horsepower drives, some stock is left on the gear rims. After machining, the gear is fitted to its shaft and placed in a special lathe on babbitt bearings exactly as it will rest in a gear housing. The outside diameter and rims are turned within 0.0005 in. total runout.

**Cutting**—The blank is mounted on its rims in the gear cutting machine. A tool on the hob slide finish turns the support for the gear.

A large hole in the center of the table is connected to an access tunnel. Through it, the top and bottom journals of the shaft can be checked for concentricity. Allowable limits of this operation are 0.0003 in. total runout.

After checking concentricity, the gear is clamped to the support and the roughing cut started. When that operation is completed, tension of the hold-down bolts is reduced and the shaft again checked for concentricity.

Finished hobs are inspected for



This little gear is no more precise than the king-sized one on the preceding page. Mismatch is less than 0.0005 in.

sharpness and concentricity, the spindle for end play.

Throughout finishing, temperatures of the several parts of the machine are extremely important. The cutter spindle bearings must run consistently at a moderately warm temperature. Large temperature variations cause serious errors.

**Checks**—After the last cut, the gear is checked for taper by indicating over a pin at several places across the face width. The lead is checked by traversing the machine with the differential engaged. Both checks show errors caused by cutter wear or blank distortion during the cutting cycle.

An inspection of the machine is made periodically with levels and alignment fixtures. Western Gear's large hobbing machines (for gears 40 to 150 in. in diameter) have two index systems: One for roughing and the other for finishing.

**Shaving** — After burring, the gear and pinion are rolled together in their housing. Small errors are corrected by shaving.

Mounted in their own journals, gears are shaved in the sleeve bearing of the shaver. A concentricity of 0.0005 in. total runout on gears 120 in. in diameter is not uncommon.

Spacing checks are made with a portable machine, and the gears are again rolled in their housing. By raising or lowering one end of the shaft, helix match may be measured. Even for gears with an 18-in. face, a mismatch between gear and pinion of 0.0005 in. is the usual limit.

The involute of large gears is judged by contact with the mating pinion under various torques. It is usually possible to crank a unit a few revolutions under full torque to make certain the profile contact does not concentrate in one area of the tooth. Several trips between the housing and the shaving machine may be required to adjust the contact.

Small changes in the involute form are possible if you change the feed and speed of the cutter. Major changes require a different cutter. After the final analysis, the gears are run under load.

**Instruments**—Large instrument gears are turned before the bore is ground because they are light, nonferrous and don't have an integral shaft.

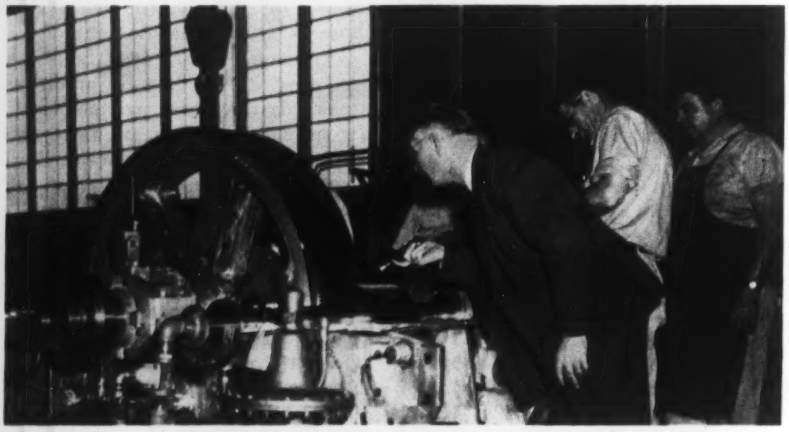
The sides of the rims or locating side surfaces are hand scraped to obtain the proper degree of flatness. This is necessary to prevent clamping distortion.

The same precautions taken in the high horsepower gearing are used with instrument gears. Torque wrenches control clamping pressure. Cutting machine temperature is controlled and recorded throughout the operation.

The same machines are used: Shaving is done on a vertical machine which supports the gear like the cutting machine.

**Close** — Many large instrument gears are nearly as accurate as master gears. Shaving such gears is a delicate operation; trips between shaving and gear inspection are frequent.

When the gear will be mounted on a large ball or roller bearing, this same bearing is used in the inspection machine.



This government inspector is taking a look at tooth contact in a large, nonmagnetic gear unit under a load

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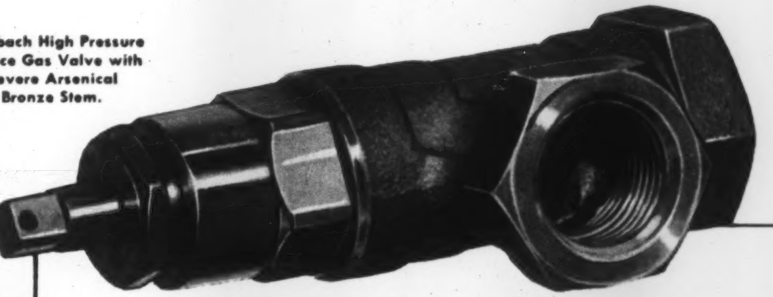
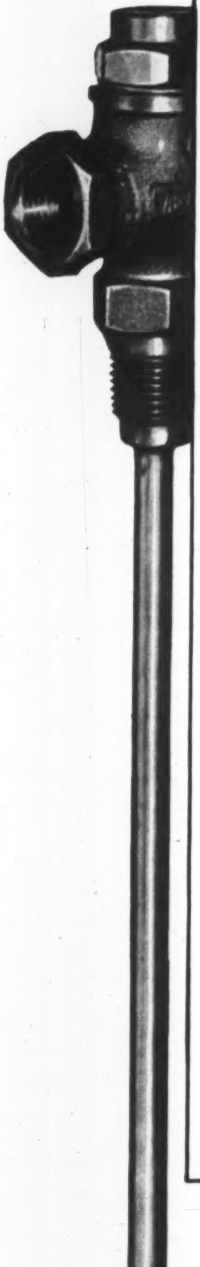
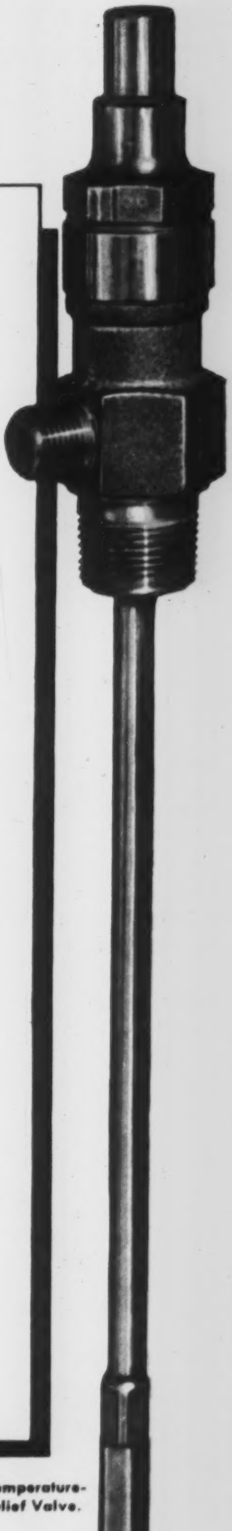


Welsbach High Pressure Service Gas Valve with Revere Arsenical Bronze Stem.





# REVERE

## Deep-Drilling Brass Rod

### Increases Tool Life over 200% for Welsbach Why not try it yourself?

In the manufacture of valves the Kitson Division of The Welsbach Corporation, Philadelphia, Pa., has to deep-drill brass rod. Originally the rod was free-machining brass. However, when Revere discovered the extent of the drilling it was suggested that our Mixture 252, Deep-Drilling Brass, would be preferable. This was tried, and the machine shop foreman reported that tool life was increased over 200%. In one item it is possible to bore with a single operation, against the former practice of withdrawing the drill three times in order to clear the chips. Revere's Deep-Drilling brass produces very small, easily cleared chips.

Another item is a high pressure gas valve, with a cast body and brass rod stem. The rod was changed to arsenical bronze, which costs a bit more, but it ended flaking and galling between stem and seat, and materially reduced rejects. Still another instance of Revere service concerns a hot water heater relief valve. The original model was cut out of bar stock. We suggested a high leaded brass tube, hexagon outside, round inside. This greatly reduces machining, has a better surface, and a better seat. Costs more by the pound, but saves more by the piece.

Revere salesmen and Technical Advisors are always glad to collaborate in seeking ways to save money and improve products. Perhaps we can help you!

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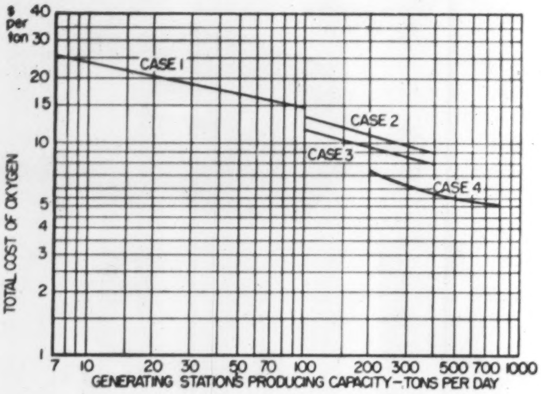
Welsbach Temperature-Pressure Relief Valve.

Welsbach Emergency Gas Shut-Off Valve, automatic.

Pressure Relief Valve for water heaters.

**Basis for estimating total cost of oxygen:**

| | |
|---|---|
| Capital charges, including 15-year depreciation, interest and insurance | 12 per cent per year of installed plant cost |
| Electric power | 8 mills per kw-hr |
| Cooling water | 2 cents per 1000 gallons |
| Maintenance | 1.5 per cent per year of installed plant cost |
| Labor: Operator (for plants up to 50 tons per day capacity) | $2.50 per hour per shift |
| Helper (in addition to operator for plants over 50 tons per day capacity) | $2.00 per hour per shift |
| Fringe benefits | 15 per cent of wages |



# Economics of Oxygen

THE WRAPS are coming off the cost of oxygen used in steelmaking. Some have suspected a touch of bookkeeping hocus-pocus in user figures that have leaked out. Seller figures released by Air Products Inc., Allentown, Pa., at the AISE meeting in Cleveland, add a second dimension.

They were broken down into levels (see chart above for cost range) which cover most user requirements in the modern steel plant:

Case 1. High purity oxygen for standard critical requirements including scarfing, welding, cutting and maintenance and occasional other uses such as decarburization.

Case 2. High purity oxygen for standard critical requirements, plus large steady capacity for uses such as oxygen converter steelmaking.

Case 3. High purity oxygen for standard critical requirements, plus intermittent high capacity for oxygen lancing or air enrichment in the open hearth.

Case 4. High purity oxygen for standard critical requirements, plus intermittent low purity capacity for air enrichment in the blast furnace.

**Cost**—The charges on which the cost curves are based are also shown with the chart above. On a Case 4 generating station producing 500 tons per day, they work out to approximately 55 per cent for power, 33 per cent for capital charges and the balance for cooling water, maintenance and labor. The ratios vary, of course, for each type installation.

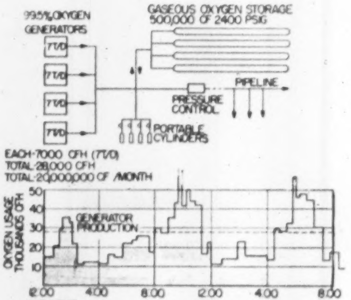
One of the chief factors affecting cost is degree of continuity required. Oxygen production costs most when the plant must be able to supply peak demand on a continuous basis.

The Air Products figures are based on purchased oxygen-making facilities. The cost of oxygen from a leased plant is slightly higher, but leasing has the important advantage of permitting the consumer to acquire a complete facility without capital investment.

**Case 1** covers generating stations furnishing high purity (99.5 per cent) oxygen for critical requirements such as machine and hand scarfing. Mill consumption will range between 5 and 100 tons per day. Absolute continuity of supply is provided by multiple generators. The oxygen is distributed through pipelines and through portable cylinders charged at the plant.

Total cost for all oxygen, including that charged into cylinders, will vary from about $26 a ton for a capacity of 7 tons per day to $14.50 a ton for a capacity of 100 tons per day.

Expressed another way, this would amount to 10.8 cents per 100 cu ft at a capacity of 5 million cu ft per month, down to 6 cents per 100 cu ft at a capacity of 72 million cu ft per month.



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# Mister, you're looking at a panelboard that's really built for Heavy Duty!

The heart of this QMB Saflex Distribution Panelboard is the quick-make, quick-break, horsepower rated switch unit.

It's loaded with features—

- **Each switch unit individually enclosed in heavy gauge steel**
- **Dead front construction**
- **Heavy duty cast operating handle**
- **Double-spring mechanism insures positive opening under full load**
- **Visible blades for maximum safety**
- **Positive pressure fuse clips and switch jaws assure maintenance-free connections**
- **Cover interlock prevents unauthorized access but makes normal maintenance easier**

## QMB Saflex Distribution Panelboard

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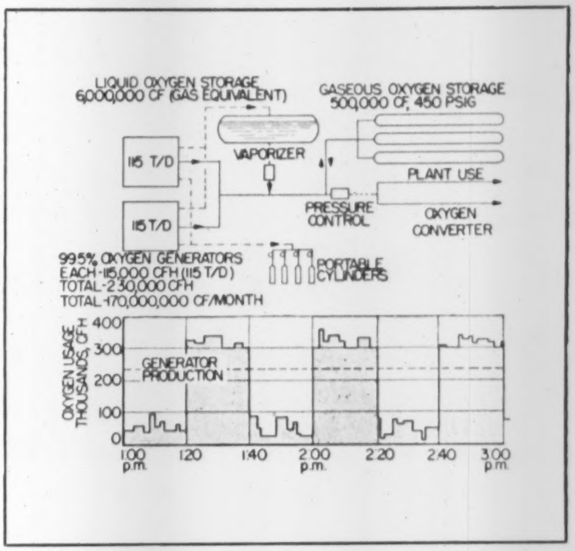
**SQUARE D COMPANY**

**Case 2** covers generating stations which furnish oxygen for Case 1 requirements and critical tonnage requirements such as oxygen converters. With multiple converters, the oxygen requirement is continuous.

Such an installation would include two identical and independent generators, each capable of handling well over one-third of the peak load; gaseous storage to carry the consumption peaks and be replenished in the consumption valleys; and liquid storage to provide a stand-by source during maintenance and defrosting shutdowns of either generator. Capacities will range from 100 to 400 tons of oxygen per day. An open hearth plant using oxygen on a continuous basis for improved combustion would require a similar installation.

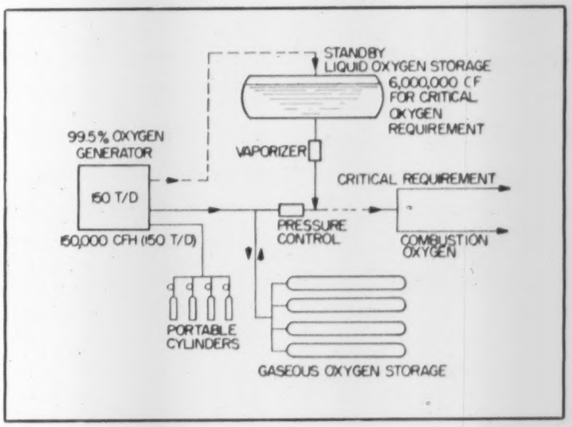
Total cost for all oxygen, including oxygen charged into cylinders, will vary from about $13.20 per ton for a capacity of 100 tons per day to about $9 per ton for a capacity of 400 tons per day.


LIQUID OXYGEN STORAGE
6,000,000 CF (GAS EQUIVALENT)
GASEOUS OXYGEN STORAGE
500,000 CF, 450 PSIG
115 T/D
VAPORIZER
115 T/D
PLANT USE
PRESSURE CONTROL
OXYGEN CONVERTER
99.5% OXYGEN GENERATORS
EACH-115,000 CFH (115 T/D)
TOTAL-230,000 CFH
TOTAL-170,000,000 CF/MONTH
PORTABLE CYLINDERS
OXYGEN USAGE THOUSANDS, CFH
400
300
200
100
0
GENERATOR PRODUCTION
1:00 p.m.
1:20
1:40
2:00 p.m.
2:20
2:40
3:00 p.m.

**Case 3** covers generating stations which furnish oxygen for Case 1 requirements, and semicritical tonnage requirements such as for open hearth combustion. With such an installation, open hearths operate without the advantage of oxygen when the generator is shut down for maintenance and defrosting.

A typical installation would be a single generator furnishing 99.5 per cent pure oxygen. Although open hearths can operate on lower purity, producing only the high purity product increases flexibility of the generator and eliminates the need for two separate piping systems.

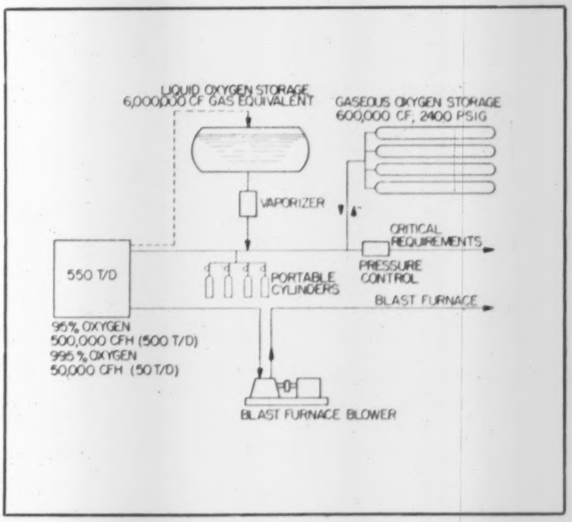
Total cost for all oxygen, including oxygen in cylinders, varies from $11.60 per ton for a capacity of 100 tons per day down to $8 per ton for a capacity of 400 tons per day.


STANDBY
LIQUID OXYGEN STORAGE
6,000,000 CF
FOR CRITICAL
OXYGEN
REQUIREMENT
99.5% OXYGEN GENERATOR
VAPORIZER
150 T/D
CRITICAL REQUIREMENT
150,000 CFH (150 T/D)
PRESSURE CONTROL
COMBUSTION OXYGEN
PORTABLE CYLINDERS
GASEOUS OXYGEN STORAGE

**Case 4** covers generating stations furnishing high purity oxygen for Case 1 requirements and tonnage volumes of low purity (95 to 98 per cent) oxygen for noncritical requirements which do not call for a stand-by source. A typical example would be oxygen for enrichment of the blast furnace blast. Such an installation could furnish oxygen for partial oxidation of hydrocarbons in a plant producing hydrogen for the H-Iron process.

A single generator would meet the requirement of 500,000 cu ft per hour, or 500 tons of 95 per cent oxygen per day. It could be provided economically with equipment to produce a side stream of high purity oxygen amounting in volume to 10 or 15 per cent of total production. Gaseous and liquid storage would be included.

Such an installation could furnish oxygen, including a 10 per cent high purity side stream, at $7.20 per ton for a capacity of 200 tons per day and for as little as $5 per ton for 800 tons per day.


LIQUID OXYGEN STORAGE
6,000,000 CF GAS EQUIVALENT
GASEOUS OXYGEN STORAGE
600,000 CF, 2400 PSIG
VAPORIZER
CRITICAL REQUIREMENTS
550 T/D
PORTABLE CYLINDERS
PRESSURE CONTROL
BLAST FURNACE
95% OXYGEN
500,000 CFH (500 T/D)
99.5% OXYGEN
50,000 CFH (50 T/D)
BLAST FURNACE BLOWER

## COMMENT AT THE METAL SHOW!

# "This is the

*Forgive us the informality of our headline. A lot of people at the Metal Show made this comment so we use it instead of the conventional superlatives.*

**○ A completely new furnace ○ No elements, no burners, no electric or gas connections in it ○ Circular shape reduces temperature losses, saves floor space ○ Greatly lowered maintenance costs ○ More accurate temperature control ○ Quiet, automatic, fool-proof.**

There just never has been a heat treating furnace like this new Lindberg Induct-O-Ring. Radically different, it has no elements, element terminals, burners, electric or gas connections in the furnace proper. The chamber, lined with a heat-resistant alloy muffle and deeply insulated, is heated by induction. All the heat is in the chamber and the work load.

Heating efficiency is high and the heating rate spectacular, with hardening temperatures reached in 17 minutes from cold. Temperature control is highly accurate and precise and temperature override and lag is eliminated for all practical purposes.

With no burners or heating elements maintenance costs and down-time are materially reduced and atmosphere requirements held at a minimum.

The Induct-O-Ring's circular shape eliminates door-opening heat and atmosphere losses and saves floor space. Actually, it is possible to have 30 feet of furnace length in a 5 foot diameter unit.

Operation of the furnace is extremely simple. Work load is automatically charged and moved through the work chamber by a gentle reciprocating movement of the entire furnace. Work is then automatically discharged into quench tank.

The Induct-O-Ring is built like a fine machine tool. Sealed ball bearings support the moving parts of the furnace. Quench tank, quench conveyor, circulation and cooling of the quench are all self-contained.

The furnace is completely adaptable to automated production processes where its precise heat control, negligible maintenance, and dependable operation are of particular importance.

We are sure that the Induct-O-Ring offers an entirely new concept in heat treating efficiency and economy. You can very easily find out how it can be used in your production processes. Just call your nearest Lindberg Field Representative (consult your classified phone book).

If it has anything
to do with the application
of heat to industry
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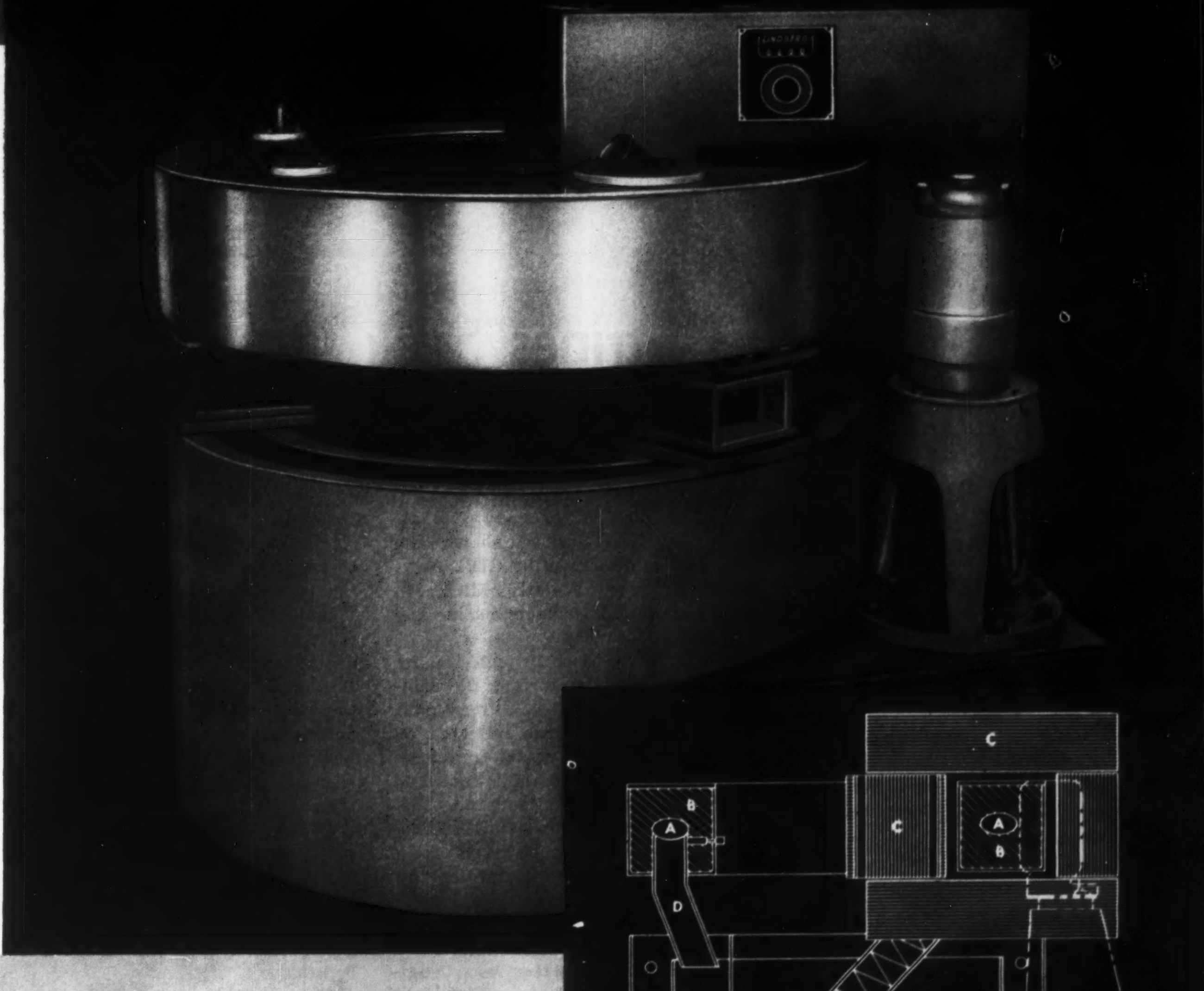
"d---dest furnace LINDBERG I ever saw"

# induct-O-ring*

FOR CARBONITRIDING, BRIGHT HARDENING, CARBURIZING OF SMALL PARTS



A. CHAMBER
B. INSULATION
C. TRANSFORMER
D. DISCHARGE CHUTE
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F. QUENCH CONVEYOR
G. OIL CIRCULATOR

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Kaiser Engineers is seeking a man of unusual skill and experience. He must have at least 10 years of progressive integrated steel plant development experience. He must know plant layout, construction design, and be of managerial caliber. He will be charged with the continued development of new steel plants and the expansion of existing plants in the U.S. and abroad. His salary will be more than generous.

This man and his family will enjoy indoor-outdoor living in the mild, smog-free San Francisco Bay Area. Here are fine new schools and famous Universities, the culture and sophistication of San Francisco, plus year around recreational opportunities ranging from sea to Sierra and including all sports.

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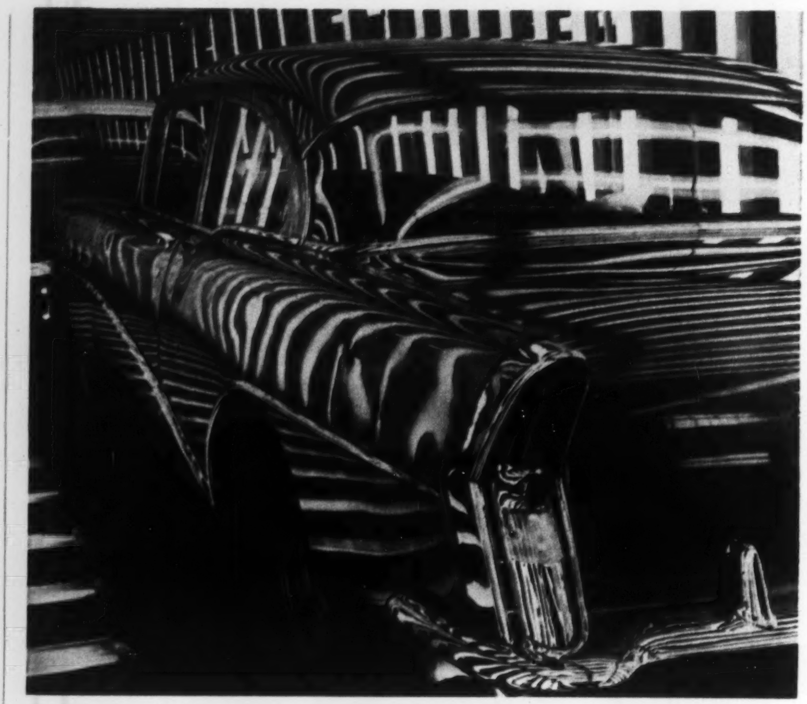


# Stripes Seek Out Flaws

## Zebralike stripes of light comb car bodies for surface flaws. GM engineers say the technique ups catch of defects and reduces inspectors' eye fatigue

THE PHOTO above shows the technique developed by GM's Technical Center, Warren, Mich., to spot file and grinder marks and other surface flaws.

As bodies pass through the inspection tunnels, surface flaws alter or interrupt the uniform light and shadow patterns reflected on the metal. GM says fewer defects are missed. Considerable time and rework costs are eliminated.

**Altered by Flaws**—Buick, Oldsmobile and Pontiac assembly plants are already using the new technique.

Conventional inspection bathes bodies in almost uniform light. Looking for a better way, engineers found a body which had flaws and spotted it in the center of a room with no outside or extraneous lighting. Months-long study began. Working on a trial-and-error basis, they tried combinations of type, color and intensity of light, together with angles of reflection, to see which did the best job of picking up flaws.

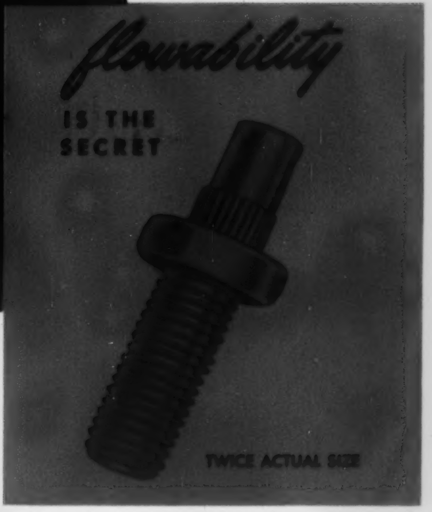
**Conclusions** — They found that too much light tended to hide bad spots and produced eye fatigue. They also discovered: The greater the angle of reflection, the more noticeable flaws became; that defects could be seen best when the edge of a beam of light fell on them.

If the edge of the beam is the best detective, why not supply more edges? Their answer: Alternating light and dark bands. In effect, this gave them a continuous group of light edges to search bodies.

First used for the body-in-white stage of assembly (just before the raw metal forms go into the painting rooms) the technique moved down the line and is being used after the bodies have a high paint polish.

SCREW
CENTRAL
COMPANY

KEYSTONE XL WIRE STUDY



## Tough cold heading jobs . . .

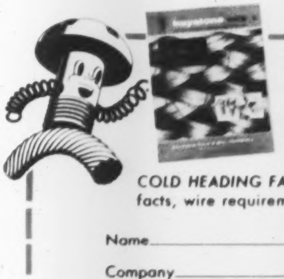
***longer runs . . . lower costs***

CENTRAL SCREW CO. of Chicago, Illinois, tackles many intricate cold heading jobs. A few are illustrated. All are processed from Keystone "XL" Wire. The auto horn mounting stud, shown in the color panel, was a tough forming job, upset in two blows. After trying other wires, Central Screw Co. changed to Keystone "XL" Wire and successfully produced this part with much longer runs due to increased die life. Rejections were cut to a minimum. The result—a quality finished product at a lower cost.

Time and again, quality Keystone "XL" Cold Heading Wire has made it possible to perfectly form the most intricate fasteners or parts. A Keystone Wire Specialist will gladly discuss your problems and make recommendations. Your inquiry is invited.

*Keystone Steel & Wire Company, Peoria 7, Illinois*

**KEYSTONE**
WIRE FOR INDUSTRY



KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

Mail coupon for free booklet—COLD HEADING FACTS! Discusses methods, technical facts, wire requirements and other data.

Name________________ Title________
Company________________
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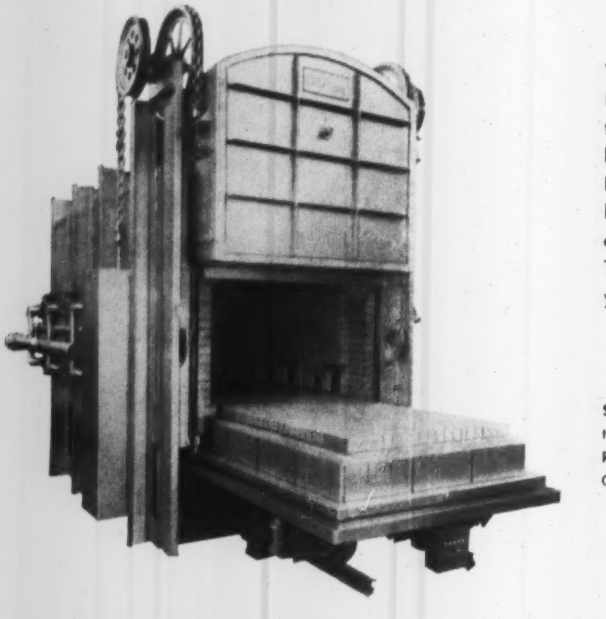
City________________ State________

# Stability . . .

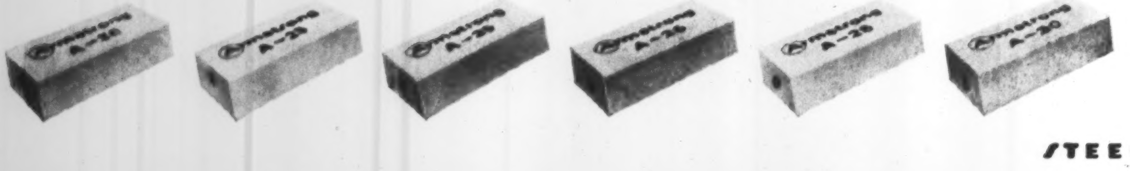
## get high resistance to controlled or normal furnace atmospheres with Armstrong Insulating Brick

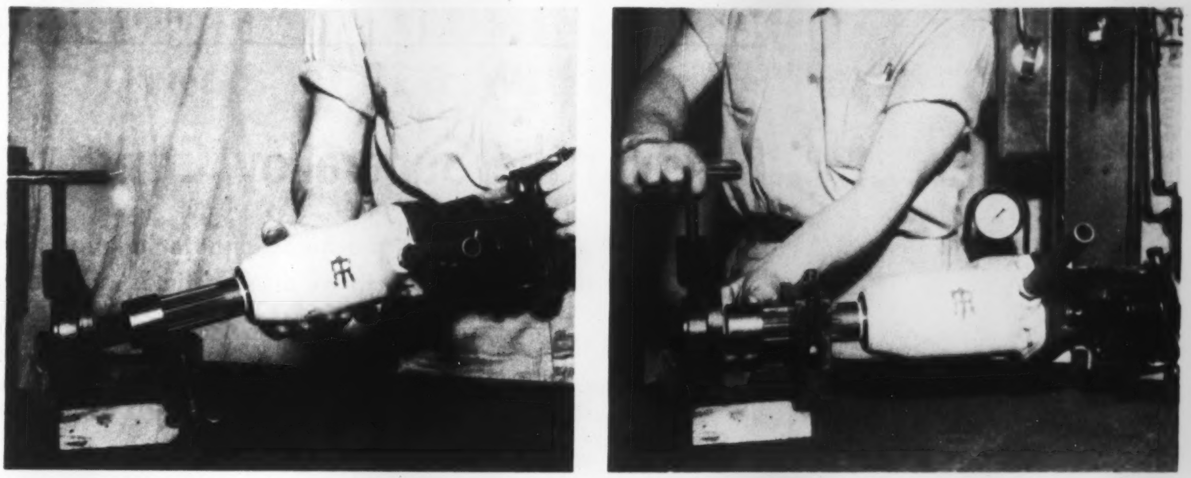


You can avoid deterioration or disintegration of insulating fire brick furnace linings under controlled or normal furnace atmospheres by using a brick type that meets specific job requirements. In the complete Armstrong line of insulating fire brick, there is a type for almost any atmosphere or application commonly used in metal processing. Trained engineers will be glad to help you make your selection.

**Send for free booklet** describing in detail the entire line of Armstrong Insulating Refractories. Address Armstrong Cork Company, 2711 Reed Ave., Lancaster, Pa.

**Armstrong INSULATING REFRACTORIES**





Impactool is placed in a simple jig, calibration collar slipped off and the adjusting screw turned. Collar is replaced at new setting

# Put Quality Into Bolt Tightening

**Combining torque control and hydraulic calibration improves the quality of high strength, bolted construction. The system overcomes many variables and reduces inspection time**

GET rid of operator guesswork if you want the most out of a nut and bolt.

There's more than one way to do it, says A. G. Ringer, chief engineer for Ingersoll-Rand Co., New York. Most practical methods involve a tool and a control for torque. The best ones represent a kind of portable automation.

Ingersoll-Rand's answer is an impact wrench called Impactool. It gets its accuracy from a torsion bar which is coupled to a shutoff valve. When the preset torque is reached, the tool shuts itself off.

Here's what Mr. Ringer has to say about tightening problems:

**Whole Story**—There's a lot more to quality bolt fastening than torque. You get top value only when bolts are stressed correctly, when each one has the right amount of pull.

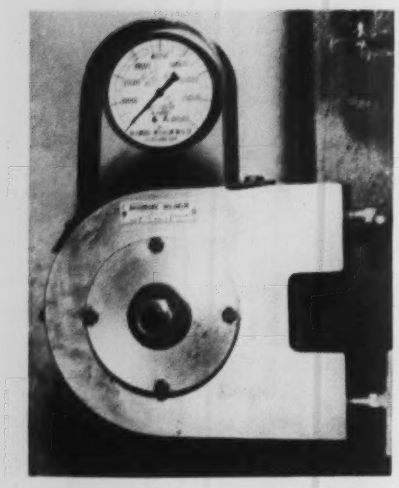
One of the best measures of stress is elongation, but it's not a practical field tool. Torque is used as an indirect measurement.

W. C. Stewart, technical adviser, Industrial Fasteners Institute, Cleveland, calculated the approximate effect of friction on torque. In bolts and other threaded fasteners, he says, 50 per cent of the torque is used to overcome friction on the bearing face, and 40 per cent to overcome friction on the contact flanks of the threads. Only 10 per cent produces tension in the bolt.

**Job Testing**—These factors affect friction: 1. Fit of nut and bolt. 2. Condition of the hardened washers. 3. Variables in steel. 4. Lubrication.

To insure accurate tightening, you must measure such variables on the job. Test the bolts, nuts and washers in each lot that you expect to use.

Calibration of the Impactool and nuts and bolts is easy on a good tester like the Skidmore-Wilhelm (pictured on the next page), which gives direct readings in pounds of tension on the bolt. A rugged, precision instrument, it weighs



Skidmore-Wilhelm hydraulic calibrator gives direct readings in pounds of bolt tension. It's a direct method of checking effect of torque

only 50 lb. It can be clamped to any vertical steel column.

**Operation**—The Impactool combines the advantages of a standard impact wrench and automatic control. The torque it delivers isn't affected by such things as variations in air pressure, condition of the tool and changes in the length of the supply line.

The key is a torsion bar which is twisted in a simple jig to a selected stress. A calibration collar locks the setting. The tool runs nuts with all the available speed and power until the resistance reaches the preset stress. The mechanism rebounds and trips a rubber-faced shutoff valve. It will run nuts to the same torque until the torsion bar setting is changed.

**Better Way** — Setting the tool can be done two ways: 1. Run test bolts and check them with a hand torque wrench. 2. Run test bolts in a hydraulic tester like that made by Skidmore-Wilhelm Mfg. Co., Cleveland.

The hydraulic method is better because it calibrates in terms of bolt tension.

With a properly calibrated tool, the workman does not have the responsibility for running nuts and bolts to the correct tension. All he does is put the tool on the nut and run it until it shuts itself off.

The result: Maximum benefit from a high quality fastener.

# Meeting the Superalloy Crisis

## Needed right now are machines and techniques that will cut them at one-fourth of present times and costs

WE CAN'T allow superalloys to force us back to 25-year-ago cutting speeds and costs.

Superalloys are a positive necessity for future planes and missiles. We'll be using them on a large scale. They now account for 10 per cent of airframe weight. In the next ten years, the figure could jump to 25 per cent.

**Challenge**—Compared with aluminum, it costs four times as much and takes four times as long to produce superalloy parts. This spells rapid obsolescence for today's machine tools and cutters. It spells obsolescence even for today's cutting techniques.

What's needed, says Thomas L. Taylor, consulting engineer, is bold, revolutionary thinking on metal removal problems. In his Air Force sponsored report, he says the industry needs drastic development in removal techniques—suggested possibilities include chemical milling, electrical and ultrasonic cutting, abrasive blasting and thermonuclear cutting.

**Approaches** — The report says that the aircraft experts put only part of the challenge in the laps of machine builders. They also recommend: Searches for high strength metals with better machinability, production of parts to close tolerances so metal removal is minimized, development of annealing heat treat combinations that will permit free cutting followed by high strength heating and quenching, and the development of better cutting tools, particularly domestic diamond types.

**Machine Improvements** — Only some of the recommended approaches show much potential. Others, like new material developments combining free machinability and high strength, show little promise.

All these approaches seem to be long range, and the industry can't wait. To meet immediate requirements, aircraft production experts say they need these developments on present equipment:

**Turning, Boring**—Machines must be more rugged. We should eliminate as many joints as possible between the tool and the carriage, and replace gear trains with electric or fluid motors. We should consider reversing spindle direction (tool goes upside down) to throw chips down away from the operator, keeping the spindle at the bottom of the bearing, and permitting simple coolant flooding to come into cut from "under" the cutting edge, cooling the work rather than the chips.

**Milling**—Needed are new techniques for routing thick packs of large superalloy blanks (to avoid sawing of single sheets or thin packs and filing or grinding of sheet edges). Spar mills must be more rugged, with low variable speed range and suitable horsepower. Knee-type mills should have a rigid base, and support at the knee end. Hardened ways or guides are musts. Some have suggested the use of flywheels on milling spindles to eliminate power pickup impact on the cutter teeth.

**Drilling, Tapping**—The need is for rugged gantry drill presses with high horsepower. All drill presses should be sturdier, have preloaded bearings and positive feeds. Because new materials work harden, reversal of spindle and feed before the drill is removed should be considered. Tapping machines should have leadscrew feeds.

**Broaching**—The aircraft industry needs machines with horizontal tables with a vertical broach pulled from below. There's considerable industry interest in portable broaches for assembly operations.

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Monarch's "non-competitive" experience in both aluminum permanent mold and aluminum and certified zinc die casting offer you factual answers on the right method to obtain highest quality at lowest end-cost.

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*Built-in grill:* High polish Velvaglaze*.

*Waffle baker:* Velvaglaze* highlights product appeal, produces mar and heat resistant cooking surface.

*Electric Fry Pan:* Catches vogue of color-in-the-kitchen with easy-to-clean Spectraglaze* and polished finish.

* Velvaglaze, Spectraglaze and Monarcast are Trade Marks of

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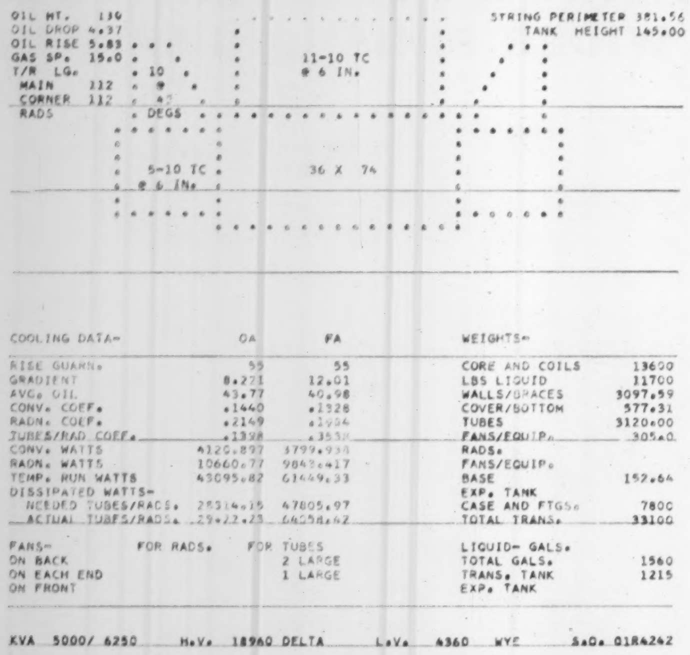

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OIL HT.   136                                      STRING PERIMETER 381.56
OIL DROP 4.37                                          TANK  HEIGHT 145.00
OIL RISE 5.83
GAS SP.  15.0                     11-10 TC
T/R  LG.        10                @ 6 IN.
 MAIN     112    @
 CORNER   112    45
 RADS            DEGS

             5-10 TC             36 X  74
             @ 6 IN.

COOLING DATA-               OA        FA          WEIGHTS-

RISE GUARN.                 55        55          CORE AND COILS      13600
GRADIENT                 8.271     12.01          LBS LIQUID          11700
AVG. OIL                 43.77     40.98          WALLS/BRACES      3097.59
CONV. COEF.              .1440     .1328          COVER/BOTTOM       577.31
RADN. COEF.              .2149     .1954          TUBES             3120.00
TUBES/RAD COEF.          .1398     .3538          FANS/EQUIP.         305.0
CONV. WATTS           4120.897  3799.934          RADS.
RADN. WATTS           10660.77  9843.417          FANS/EQUIP.
TEMP. RUN WATTS       43095.82  61449.33          BASE               152.64
DISSIPATED WATTS-                                 EXP. TANK
  NEEDED TUBES/RACS.  28314.15  47805.97          CASE AND FTGS.       7800
  ACTUAL TUBES/RADS.  29422.23  64258.42          TOTAL TRANS.        33100

FANS-          FOR RADS.    FOR TUBES             LIQUID- GALS.
ON BACK                     2 LARGE               TOTAL GALS.          1560
ON EACH END                 1 LARGE               TRANS. TANK          1215
ON FRONT                                          EXP. TANK

KVA  5000/ 6250    H.V.  18960 DELTA     L.V.  4360  WYE     S.O. 0184242
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**This is the type of engineering information, including an outline sketch of a transformer, that the computer at Westinghouse's Sharon, Pa., plant turns out. Information can be used directly in making the working drawings**

# Computer Makes Magic

**Westinghouse shows off its expanded Sharon, Pa., transformer plant and spectacular transformer test center, but a versatile computer behind the scenes steals show**

FOR several months a stream of visitors has been flowing through the Westinghouse Electric Corp.'s transformer plant in Sharon, Pa. The reason: To view the new transformer test center (opened officially on Nov. 1).

There is no doubt that the test center is a terrific development. A transformer as big as a four-story house could be slipped into the anechoic (noise killing) vault with plenty of room left over. Radio waves would have to act like corkscrews to get past the radio influence barriers. High - voltage equipment can compete with lightning in destructive power.

These are only the fancy clothes of a $13-million expansion program. The whole division has been geared to increase its productive capacity for power transformers by more than 30 per cent. How many of the visitors looked beyond the test center and saw the nerve center which will make the expansion pay?

**Computer** — What they would have seen is an International Business Machines 705 computer with the sterile, efficient, electronic look of computers the world over. The difference is that this one will work across the board for the division. Sales, distribution, design, inventory control, research and payroll accounting will be its province.

That is unusual. Computers have ordinarily been thought of as: 1. Scientific tools that take a minimum of information, perform a vast number of operations with it, and come up with a concentrated and generalized output. 2. Or business tools that take a maximum of information, perform a limited number of operations with it, and come up with a raft of answers that can be used as is.

**Everybody Happy**—The business side of the division wanted a business type computer. The technical side wanted a scientific type. Since no one application would support a large scale computer, they settled for a versatile business type and everyone concerned is tickled pink.

The computer day is set up so that checking, maintenance, memory updating and problem solving get a fair share of the machine's time, which is rated at $300 an hour ($35,000 a month rental). It takes relatively little incentive to keep the machine busy.

**Design**—The cycle starts with engineering. Someone needs a big transformer to perform a particular job under closely specified conditions (big transformers are all specials). What is the best design to fill the bill? That is what the engineers ask the computer.

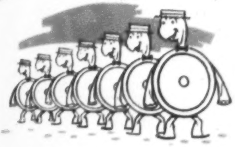
It takes the specifications and calls on its stored memory of components, circuits, materials and operating characteristics. Out comes a bill of materials, dimensions, weights, cooling data, and to top it all, an outline picture of the transformer (see illustration above). To test the computer's reasoning, engineers introduce design changes into the machine which the computer will accept or reject until it is clear that an optimum design has been reached.

Ordinarily, it takes an engineer three days to wrap transformer data and specifications into a form that the drafting department can use. The IBM 705 does it in 3 to 6 minutes.

**Manufacturing**—Once the engineering design is completed, the next operation is to spell out in

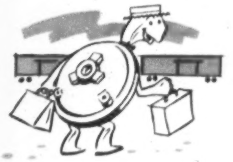
# BOY!

## LYNCHBURG FOUNDRY
# SHELL CASTINGS
## SAVE SAVE SAVE!

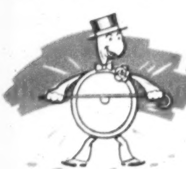


**GREATER UNIFORMITY**—They don't have to spend so much time getting ready to grind on me, and my shell has a better chance of pulling through the machine shop operation. Sometimes my shell has to be balanced, and the greater uniformity saves on this operation too . . .

**LESS MACHINING**—Fewer backaches! Close control of dimensions makes for less machining, faster machining methods, or in some instances elimination of machining altogether.

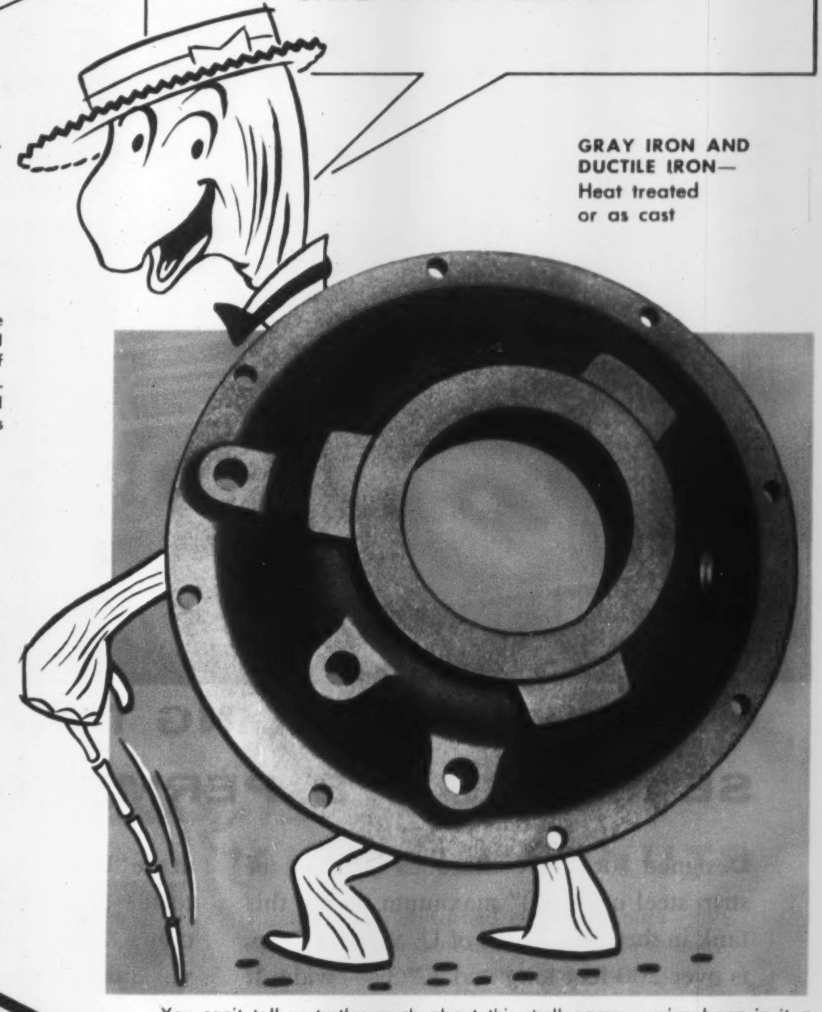


**MADE FOR LIGHT TRAVEL**—My Lynchburg Foundry shell surely makes for cheaper transportation fares — less machine stock makes me a "Light-Weight".



LFC

**SUPERIOR SURFACE FINISH**—I call it "eye appeal"—I really feel sharp in my Lynchburg Foundry shell molded shell. Saves wear on machine tools too.



**GRAY IRON AND DUCTILE IRON—**
Heat treated
or as cast

You can't tell us turtles much about this shell game—we've been in it a long time—but I'd sure like for my whole family to hear about Lynchburg Foundry shell castings.

The snazzy outfit I'm wearing is called a gear box cover—shell molded, of course. You ought to have seen all the things that had to be done to an outfit like mine in the old days—before shell molding. But all that's changed—even the bolt holes around the edge are cast in. Then too, the pipe tap holes are cast so accurately that the drilling operation, which normally precedes the pipe tapping operation, is eliminated. And the machining that has to be done takes a lot less time—there's less machine stock, and the chucking lugs are cast so accurately.

As one shell man to another, take my advice—specify Lynchburg Foundry shell castings.

## LYNCHBURG FOUNDRY CO., Lynchburg, Virginia

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Designed for the continuous pickling of strip steel up to 80″ maximum width, this tank in the Irvin works of U. S. Steel Corp. is over 200 feet long and 12′ 3¾″ wide. It is lined with United States Rubber Company's protective PERMOBOND® Lining.

Today's ever-increasing production requirements call for longer and larger pickling baths that must be lined on the job. In this instance 5 individual sections lined at the "U. S." Fort Wayne plant were shipped to the customer's mill. There "U. S." field crews "bandaged" the welded sections and vulcanized them to make one continuous lining with no seams or joints.

"U. S." sales engineers will consult with you about any corrosion problem for new or existing processing equipment. Contact us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

**Mechanical Goods Division**

**United States Rubber**

**COMPUTER . . .**

shop language what is to be built, how many to produce, where to obtain materials, when to begin and complete each operation, rates to be paid, delivery points and costs. This information, often in great detail, must be transcribed on a multitude of forms. In the transformer division at Sharon, the masters for these forms used to take up great banks of filing cabinets. Duplicating them was a great time waster.

Now the 705 makes out most of the shop paper from masters stored on a roll of magnetic tape. It turns out punch card pay documents, production follow copies, move tickets, feedback cards, group leaders' records, identification tags and delivery receipts already filled in for each order. Upon request, the computer will prepare daily production status reports on each order. It will also analyze parts in process and develop cost data.

**Payroll**—A complete payroll accounting system for hourly and salaried employees has been designed into the machine. For hourly workers, the computer starts with punched time documents and clock cards, totals hours worked and calculates incentives earned, deducts such items as charges for taxes and union dues, writes a pay check and keeps a printed record for reconciliation.

Unable to print money, the calculator does the next best thing by saving it through paper-work efficiency.

**Inventory Control**—The machine has the speed and accuracy needed for inventory control "by exception." In this advanced procedure, the machine selects only those areas which need immediate action. To arrive at its decisions, the machine must answer such questions as how much to order, balancing ordering against warehousing costs, or how much safety stock to carry to allow for supplier failure to deliver.

Obviously, planning such a program for the computer took time —1½-years on the calendar, or 31 man-years when you figure the people involved. Westinghouse is showing off some amazing things in its Sharon plant, but none tops this.

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Fischer precision-turned aluminum nuts set new standards of uniformity and accuracy that speed assembly operations . . . reduce costs.

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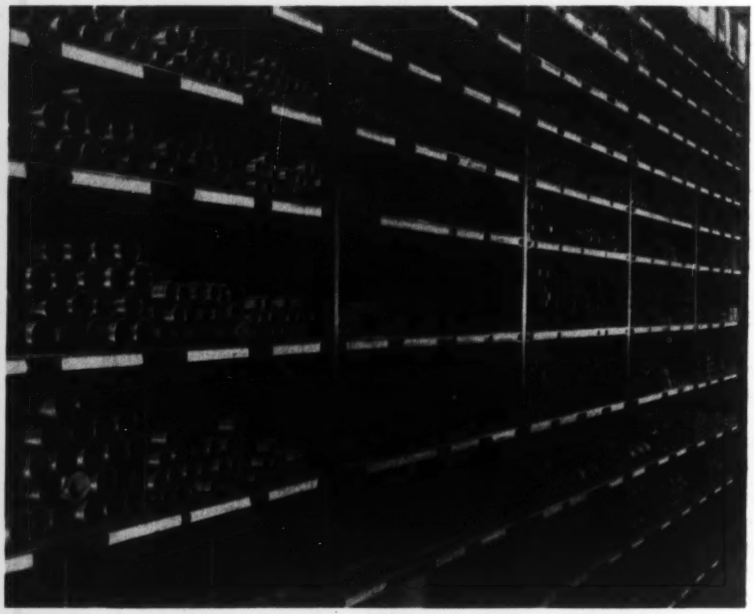

**MAINTAIN AN EASY-TO-USE TOOL ROOM.** A systematic storage arrangement using Berger tool room and shop equipment will save money, time, labor, waste motion and floor space. Every item of durable Berger steel construction does an efficient job—provides easy access to tools, parts and other inventory. Included are Wedge-Lock, Convertible or Flexi Bilt Shelving, Wedge-Lock Long Parts Storage Units, work benches, bar racks, special-purpose tool inserts and many other items. Send for catalog describing Republic's big line.

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**ATTRACTIVE LOCKER ROOMS HELP YOU HOLD EMPLOYEES.** Republic's Berger Division is world's leader in lockers, offers you types and sizes for every industrial and commercial need. Illustrated, is the space-saving Two-Person locker that's ideal where space must be conserved—or utilized to obtain maximum number of locker accommodations. A standard 15" in width, it provides separate compartments for two in same floor area required for individual single-tier locker. Modern steel lockers that provide clean, safe storage can be a powerful aid to good employee relations. Send for catalog.

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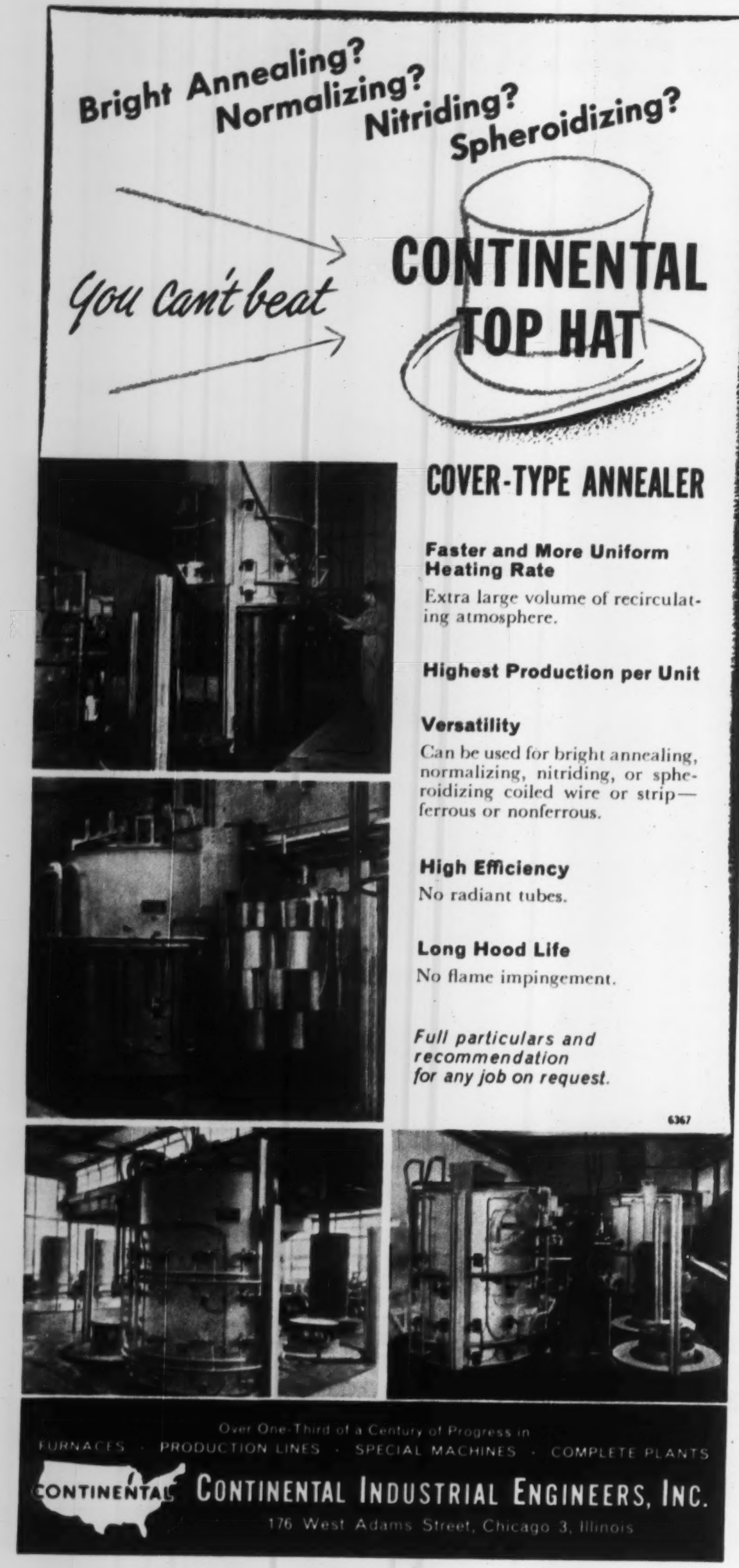

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# Die Wear Forum

DIEMAKERS urgently need longer wearing materials.

That was the consensus of the die wear forum at the recent ASM convention in Cleveland. Paul G. Nelson, metallurgist, the Budd Co., Philadelphia, was chairman.

**Prime Interests**—Many wanted more information on laminating dies.

How fast can you run them?

Some said they could get only 300 strokes a minute. Others felt that 1400 wasn't too fast. Most agreed that with the proper die set 800 to 900 was reasonable. Higher speeds caused high wear.

Several suggested that bumper pins increase die life, overcome freezing and the dead center stop.

**Best?**—How much clearance is needed for good die life in laminating dies?

The forum advised: Allow 0.002 to 0.0025 in. and ¼-degree taper.

Carbide shaving and hold-down points were favored by most.

A majority also agreed upon the six most important ways to prolong the life of draw dies: 1. Never use a radius sharper than 2½-times stock thickness. 2. Check the lubricant. Get the right kind for the job. 3. Die steel is important. Try those with graphite in them. 4. Chrome plating is a good practice. 5. Experiment with surface treatments. There are several good patented types available. 6. After every 100,000 formings, redraw the die to remove the work hardening.

**Short Runs**—A. E. Glen, Detroit, chairman of a group on die design, listed these materials as the most prevalent in short run diemaking: 1. Plastics (economical for stock up to 1/16-in. and runs up to 20,000). 2. Gray iron (takes stock up to 0.050 in., runs up to 20,000). 3. Lignum vitae (stock to 0.050 in., runs to 10,000). 4. Kirksite (sheets up to 0.060-in., runs to 30,000).

**Breakage**—If you want to cut down punch breakage, try these suggestions: Use alignments which are as close as possible. Use a guide through the stripper. Centered punches help. Flash chromed punches work better. Be sure punch grinding is done longitudinally.

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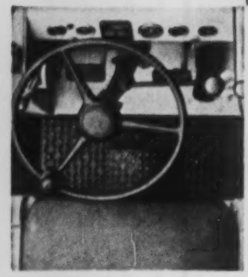
# Your Operator "Steps Lively" and likes it

## . . . with an Allis-Chalmers Fork Truck!

The operator of this Allis-Chalmers 4,000-lb fork lift truck at a large mid-west foundry is able to "step lively" because his truck drives so easily — maneuvers so well, even in tight quarters.



Important controls are at the operator's finger tips — right where he would like to have them. Gauges are in plain sight — simple and easy to read. Floor is clear, seat can be moved forward or back to suit the operator.

Your operator moves about quickly, spots loads accurately, works relaxed all day. His output is big and steady . . . his contentment is your gain.

These are benefits of the operating ease found in Allis-Chalmers fork lift trucks. Even a green operator does the right thing almost by reflex. He could find the clutch, brake, accelerator and gear shift lever with his eyes shut, for they are positioned like those in his car. The large, 18-inch steering wheel is comfortably positioned and feels "at home" in his hands.

The seat is wide and comfortable, the floor is free of obstructions. Operator can quickly step on or off either side. There is an over-all roomy comfort that seems to stretch a day's output and shorten a day's work.

Examine one of these units at your Allis-Chalmers Materials Handling Dealer's. Ask him to show you the long-life features that keep it going at a lively pace with a minimum of maintenance. Write for free descriptive bulletin, "Put Yourself in the Driver's Seat."

MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

**ALLIS-CHALMERS**

8H-16C

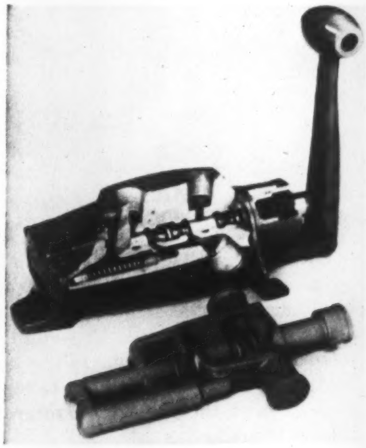
# Cast Valve Coring

## Zinc diecasting solves difficult problem in manufacture of intricate aluminum valve bodies

AN UNUSUAL diecasting technique enables Char-Lynn Co., Minneapolis, to produce a valve design featuring a host of "cast-in" advantages.

The valve protects any system against excessive pressure up to 2000 psi and surge pressures reaching a possible 5000 psi. Valve volume capacity ranges from 2 to above 12 gpm.

**Coring**—Production of the valve is impractical if standard coring techniques are used. The special casting technique facilitates coring of the intricate aluminum die-cast valve body.



ALUMINUM VALVE
*. . . with its die-cast zinc core*

First, a zinc core is diecast. The zinc core is coated with an insulating material and positioned in the valve body die. Aluminum is injected in the conventional manner. As the aluminum solidifies, the zinc core picks up heat and melts—causing a build-up in pressure. When the pressure reaches a predetermined point, a die valve is opened, relieving the pressure and allowing the molten zinc to be discharged from the die. When the aluminum casting has solidified, it is removed from the die and the cycle is repeated.

**High Output**—Machining of the valve is minimized, costs are unusually low and production is at an all-time high.

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Gentlemen: Please send us complete information concerning the new Continental #3 Finish Wire for Electroplating.

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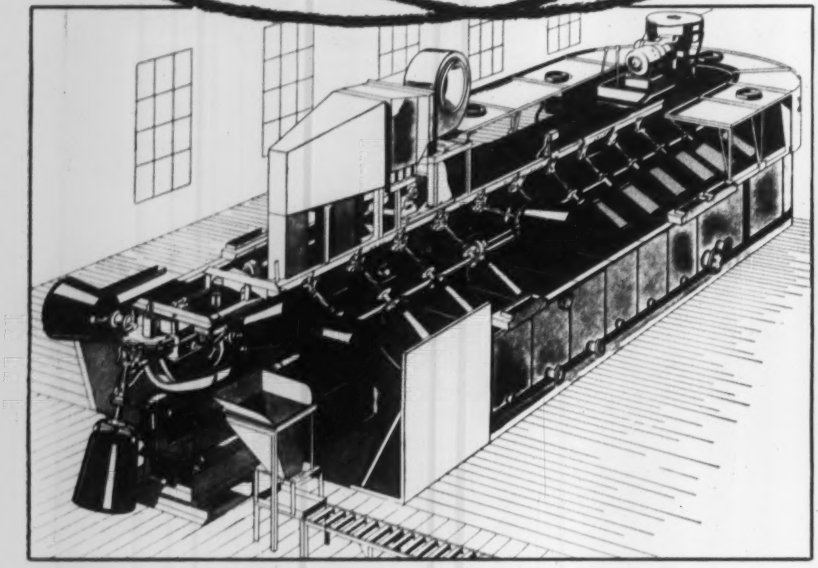
Barrel Plating by Stevens Really Cuts Costs



Since Stevens first introduced the Automatic Barrel machine scores of industries have enjoyed these operational advantages. Check them against your present operations.

**MINIMUM LABOR REQUIRED** —In most cases, one unskilled employee can operate the machine.

**HANDLES THE COMPLETE CYCLE** —Including cleaning, pickling, chromate treatments, plating, bright dip and drying.

**COMPLETELY AUTOMATIC** —No barrel lids to fasten and unfasten during automatic loading and unloading.

**BETTER HANDLING** —No mixing of parts. Becomes a part of a straight line production system.

**NO HEALTH HAZARD** —Occupational health hazards eliminated with ventilation of equipment.

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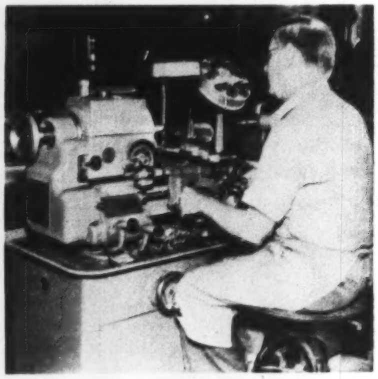
## Close Tolerance

TOLERANCES as close as 0.0005-in. are usual for a standard, 11-in. Delta metalworking lathe. The Clifford Mfg. Co., Waltham, Mass., uses it to make bellows connectors and fittings.

Clifford's chief products are heat exchangers and metal bellows used in thermostats for refrigerators, ovens and steam traps. They are made from a wide variety of metals, including stainless steel, Monel, brass, bronze, copper and silver.



LATHE
*. . . cuts to 0.0005-in. tolerances*

**Other Jobs**—The Delta lathe also machines Monel pins 0.064-in. in diameter by 0.375-in. long and holds them within the limits 0.0595-in. to 0.0600-in. Cuts as light as 0.002-in. can be taken; both ends of the pin are chamfered and deburred.

The lathe also will cut tool steel and drill rod trimming arbors to tolerances of plus or minus 0.0005-in. The flanges of bellows 2.5-in. OD and 1.01-in. ID are held flat and parallel within 2 degrees.

### Steel Founders Offer Prizes

Cash awards of $6300 will go to winners in the third product development contest of the Steel Founders' Society of America.

Top prizes of $1000, $750, $400, $200 and $100 are offered. Both employees in the steel casting industry and nonemployees are eligible.

Details are available from the Product & Market Development Committee, Steel Founders' Society of America, 606 Terminal Tower Bldg., Cleveland 13, O.

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**Penco Metal Products Division**
- Steel Cabinets, Lockers & Shelving

# "Lots of trouble to get good product"

Said by the founder of Alan Wood Steel—James Wood—over a hundred years ago, that statement set a manufacturing standard for five generations of steelmaking Woods. Today, as then, the ". . . trouble to get good product" includes modern equipment, facilities, research, development and determination. Accepting that "trouble" has led to a nearly $50,000,000 expansion expenditure in ten years that has helped us supplement our greatest selling advantages—"good products" and individualized attention to orders by a compact, fully integrated, flexible steel mill.

For detailed information on any Alan Wood product, write Marketing Division—Department AW-51.

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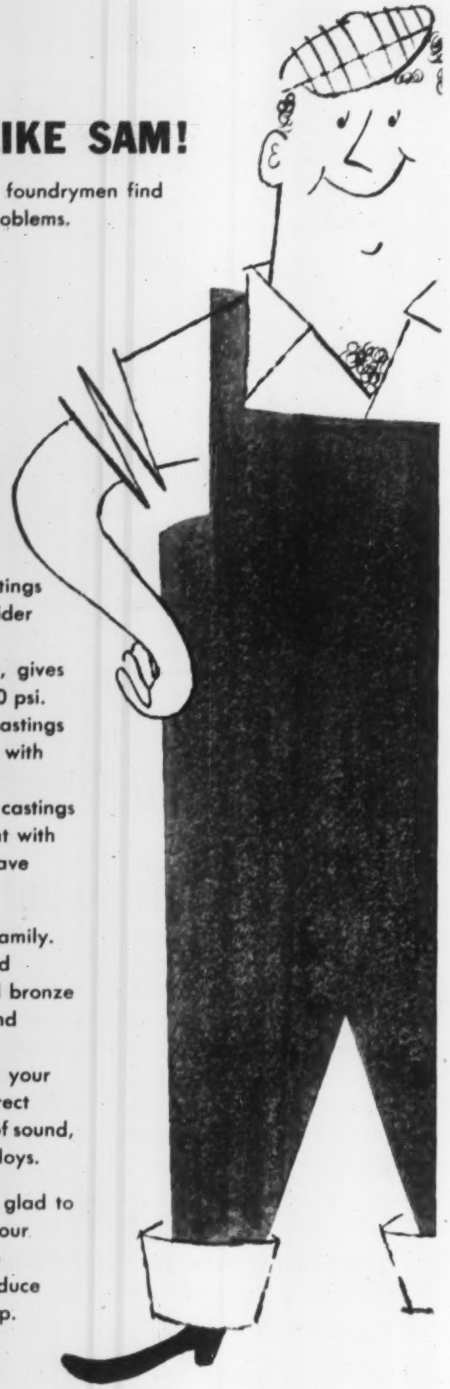

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In these days of profit squeezes, foundrymen find that SAM has a key to their problems.

SAM represents

**S**ilicon Bronze

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With these engineered bronzes, foundrymen make premium castings with properties that lead to a wider margin of profit. High-strength manganese bronze, for example, gives tensile strength as high as 125,000 psi. Heat-treated aluminum bronze castings have 120,000 psi tensile strength with high yield strength and excellent wear resistance. Silicon bronze castings combine ductility up to 50 percent with high strength. All these alloys have excellent corrosion resistance.

The SAM family is a Federated family. Federated has the experience and know-how to produce engineered bronze ingot exactly to specification. And Federated's vast store of foundry knowledge and experience is at your service to help you establish correct foundry practices and assure you of sound, profitable castings from these alloys.

Your Federated salesman will be glad to introduce you to SAM. Or call your nearest Federated office for more information on how you can produce premium castings with SAM's help.

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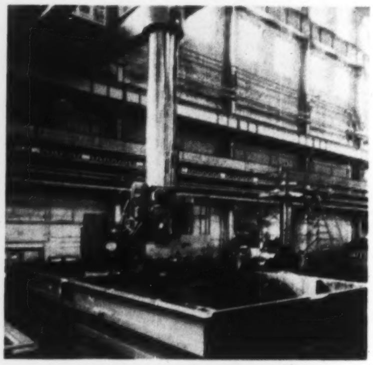
# Drill Is on Crane

## Operator can position the unit anywhere on the erection floor to drill castings and weldments

A CRANE-mounted radial drill press has cut setup and drilling time on large pieces by as much as 60 per cent at Allis-Chalmers' West Allis (Wis.) Works. It's being used to drill holes 1-7/64 and 1-7/16-in. in diameter in a water box for a 100,000-sq-ft condenser.

Designed by the firm's machine tool engineers, the unit consists of a crane bridge mounted on the lower crane rails in the erection shop, a trolley that runs laterally to crane movement, a column 30 in. in diameter and a drilling unit.

**Capacity**—The drilling unit is a modified drill press head and arm from a 4-ft radial drill press. It can drill 3 in. holes in mild steel and 4 in. holes in cast iron. The machine's column has a vertical stroke of about 15 ft and trolley travel of about 50 ft. A compressor operated, mist coolant system is built into the unit.

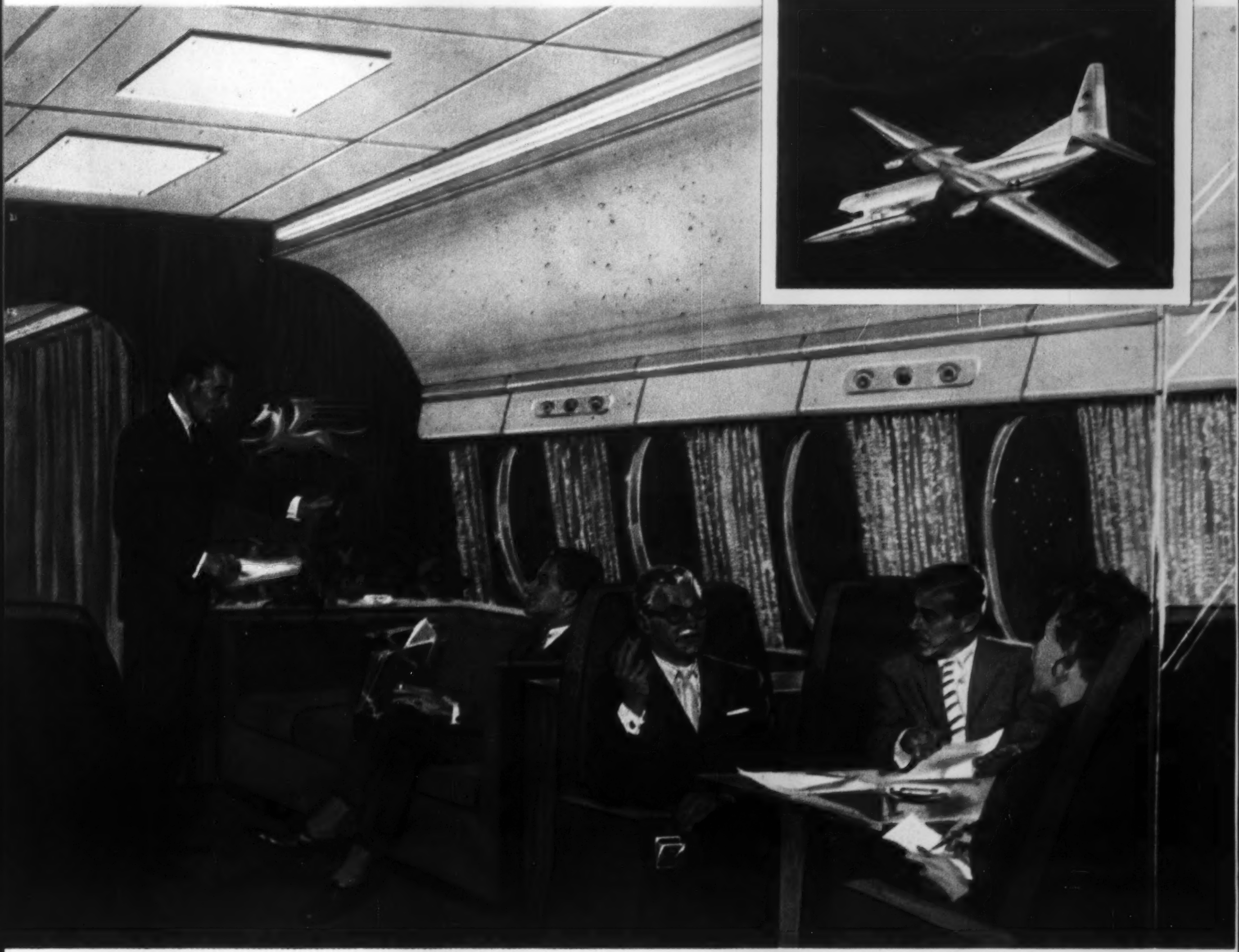


CRANE-MOUNTED DRILL
*. . . bites into large weldment*

Before the unit was built, a drill press was moved into position on parallels to drill holes into large pieces. Then the setup was dismantled, moved and reassembled to continue and finally complete the operation.

**Maneuverable** — With the new tool, the operator can position the drill anywhere on the quarter-mile long erection floor. A pushbutton station controlling five motions permits an operator to position the drill fast and accurately. The machine is equipped with limit switches and interlocks.

# Announcing—the Fairchild F-27 *Friendship*
## Propjet power for *business on the go*



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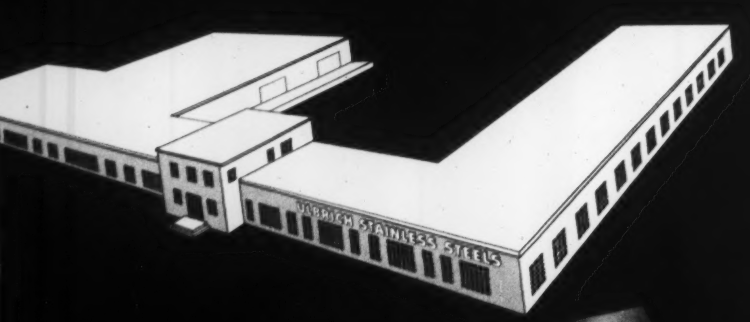

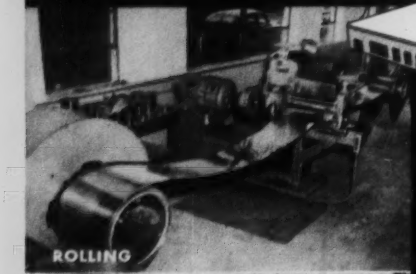
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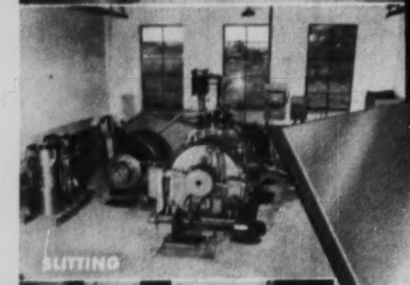
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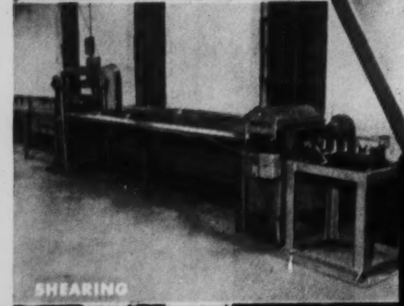
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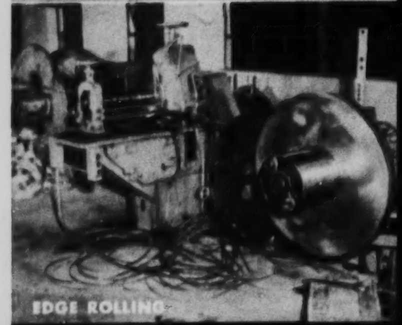
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# Makes Midget Parts

**Atomic energy and guided missiles need tiny components. Tungsten carbide aids production**

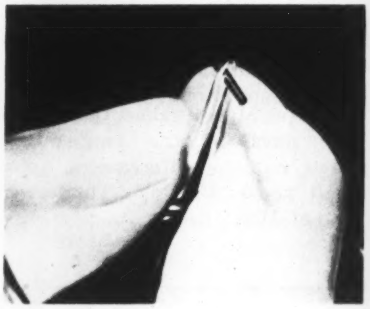
MAKERS of tiny, precision parts must rely heavily on the gagemaker's skill and knowledge. Many gagemakers themselves are producers of tiny vital items for atomic energy, aircraft and electronics.

The "battle of the millionths" is being fought with a blueprint in one hand and near laboratory type production equipment on the other hand.

One typical firm is the Van Keuren Co., Watertown, Mass. It makes precision measuring tools like plug gages, thread measuring wires, optical flats, etc.

**Problems**—The biggest obstacles in production are fine surface finishes, roundness and concentricity. For one thing, the smaller the part the more difficult it is to measure surface finish.

One salvation to those problems is tungsten carbide. According to W. G. Van Keuren, president, straight tungsten carbide grades are preferred. Carbide expands and contracts less than other metals.



CARBIDE PIVOT
*. . . both ends are scratch free*

A smooth finish is essential to a good bearing action. Carbide gives a smooth finish and has excellent resistance to galling.

**Special Equipment**—The Watertown firm makes use of special production equipment scaled down for laboratory techniques. A trick lathe setup is used to turn instrument pivots that are about 0.030-in. in diameter by 0.165-in. long. Half the length of the pivot is a square shape. A grinding and a lapping operation finish the part.

NEW
Streamliner 200

# Ozalid Streamliner 200

*full-width whiteprinting for just* **$995.00!**

**AT LAST**—*economical printmaking in full 42-inch widths!* Here's the brand-new Ozalid Streamliner 200. This compact, low-cost table-model whiteprinter gives you solid production capacity . . . turns out a print in seconds.

It's perfect for the small office—priced low for any budget. And it's an ideal "stand-by" for the big printroom. Use it when other equipment is out of service. Use it for short run "rush" work—without costly interruptions of volume printmaking.

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- full 42-inch printmaking capacity
- compact design—only 22" high . . . 27" deep
- simple, easy-to-operate controls
- automatic stacking
- sharp, fully detailed prints

For all the facts on the Streamliner 200, call your local Ozalid representative, or write: Ozalid, Dept. P-11, Johnson City, N. Y.

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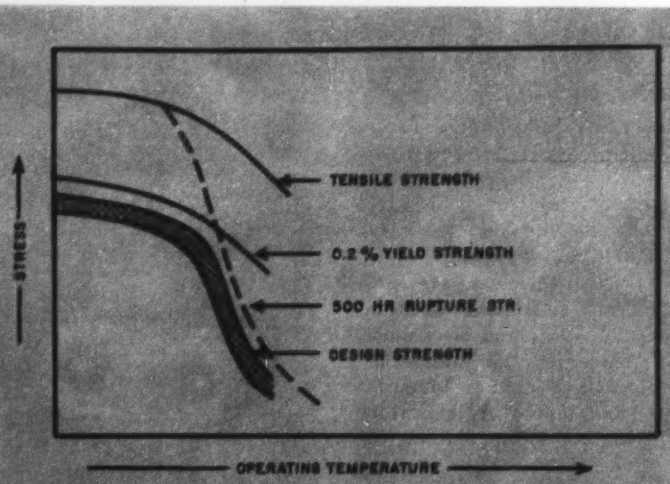
**Designers of tomorrow's high performance aircraft must consider both normal and high temperature properties of materials. Here are data on several new types of austenitic stainless steels**



A typical design curve for selecting metals to be used at room and elevated temperatures. Upper limits fall within shaded area

# Stainless in Aircraft Design

By EDWARD A. LORIA
Staff Metallurgist
Crucible Steel Co. of America
Pittsburgh

FLIGHT at high Mach numbers calls for a re-evaluation of structural materials and improvements in their performance at elevated temperatures. Stainless steels and titanium alloys rank high among materials being studied.

Designers look for these:

- High strength - weight ratio through operating temperature range.
- High stiffness - weight ratio through operating temperature range.
- Low coefficient of thermal expansion.
- High thermal conductivity.
- Low creep rate.
- Good fatigue characteristics.

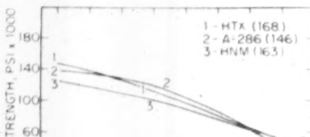
**Temperature** — Although room temperature properties of a material are important, its elevated temperature properties dictate speed limits. At the other end of the scale, some portions of an airplane are designed for low temperatures (less than 100°F).

The designer must consider service temperature in material selection. At room temperature, the prime considerations are tensile and yield strengths. At elevated temperatures, material will creep and perhaps rupture at a stress considerably below yield. Yield strength is the important factor at low temperature. Total creep or stress rupture strength is the design limit at high temperatures.

The stainless steels which best fulfill aircraft requirements can be classified generally as hardenable types. For the higher service temperatures, let's first consider the austenitic grades like Crucible's HNM and HTX, along with A-286. (Part II of this article, Nov. 12, will cover the lower service temperatures. It will consider the martensitic grades.)

**Composition** — The nonmagnetic, heat-treatable austenitic steels, HNM and HTX, depend on phosphorus to produce precipitation hardening. A-286 contains titanium and aluminum for the same purpose. HNM has the lowest strategic alloy content. HTX is a higher carbon and alloy modification of HNM, which has been made into sheet, bar and billet form. Both steels are air hardenable austenitic types, so that growth problems are not expected.

The superior structural stability of austenitic over martensitic types is quite evident for temperatures over 1000°F. Better creep strength is a contributing factor. The more highly alloyed A-286 and HTX may have higher values than HNM over most of the temperature range, but the difference is quite small above 1200°F. The lower cost of HNM favors its use.



Comparison of ultimate tensile strengths of three stainless steels at elevated temperatures. Room temperature values are in parentheses

Tensile yield strengths are used less frequently than ultimate strengths for design purposes. When yield is less than two-thirds of ultimate strength, the yield may be the limiting factor—it is often required that aircraft structures not deform permanently at the highest stress.

The yield strength may also be used as an indication of the proportional limit in designs where the elastic properties are important. HNM has excellent yield strength throughout the entire temperature range. Short-time yield strength is the limiting property up to 950°F. At higher temperatures, 1000 - hour rupture strength is the design criterion.

**Time-Temperature** — A master rupture curve for each steel is based on the parameter C = 20 (below, right). The curves permit a direct comparison of alloys and allow an educated guess of the values that would be obtained for any time-temperature combination. However, they are not precise.

The high rupture strengths of HNM and HTX at the lower end of the parameter scale and the equivalent strength of HTX and A-286 above a parameter of 37,000 are evident. Also, HNM has lower rupture strength throughout most of the range, but the values meet the current high requirements of aircraft designers for low alloy material. Its rupture strength is far superior to that of 316 stainless. Austenitic HNM has better strength than martensitic 17-7 PH and AM-350 over 900°F.

**Chemical Composition**

| Grade | C | Cr | Ni | Mn | Mo | P | Ti | Al |
|---|---|---|---|---|---|---|---|---|
| HNM | 0.30 | 18.5 | 9.50 | 3.50 |  | 0.25 |  |  |
| HTX | 0.45 | 21.0 | 8.50 | 8.50 | 1.50 | 0.25 |  |  |
| A-286 | 0.05 | 15.0 | 26.0 | 1.35 | 1.75 |  | 2.00 | 0.20 |

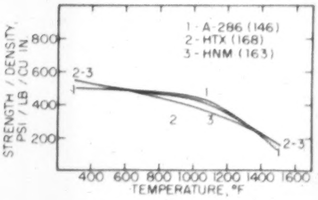
The selection of a material frequently depends as much on fabrication characteristics as on strength. The good forming properties of the austenitic steels are well known. For example, the mill-annealed values for HNM indicate that sheet fabrication is no problem. When HNM is cold rolled, it work hardens to a high degree but keeps its ductility. The properties are further enhanced by a short aging treatment. High yield strengths in excess of 150,000 psi are noteworthy. Cold rolled (0.025 x 48 in.) sheet and 0.005 in. strip have been produced. The strip responds well to aging treatment at 1000°F for 4 to 16 hours, which produces a microhardness of about Rockwell C-39.

**Welding**—HTX and A-286 can be welded provided you preheat, protect the weld metal and control heat input. HTX sheet and plate can be welded satisfactorily by the metallic arc process, using types 310 and 312 M (2 to 3 per cent Mo) electrodes, and by the inert gas process, using HTX filler wire. Butt flashwelds are also satisfactory.

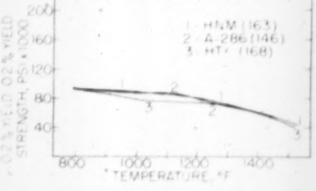
Bend tests of various weld specimens show good ductility, evidence of formability in the as-welded, solution-treated condition. You can get good weldability with HNM sheet which contains 0.20 per cent phosphorus. It has been welded by the Heliarc process and bent 180 degrees with no evidence of cracking. Regular arc welds are made using 29-9 HNM filler.

Ordinarily, you wouldn't expect precipitation-hardening steels to have the corrosion resistance of 18-8 stainless. HNM hardened to Rockwell C-39 has been compared to type 304 in the mill-annealed condition. Seven and nine-day tests were made in dilute sulphuric acid solutions at 100°F. When the concentration is as low as 0.1 per cent by weight, HNM is at least as corrosion resistant as 304. For sulphuric acid concentrations of 0.5 to 10 per cent, HNM is inferior to 304. In resistance to rusting in alternate wetting and drying conditions, HNM is equal to 304 and better than 430. In the salt spray test, HNM does not have the corrosion resistance of 18-8.

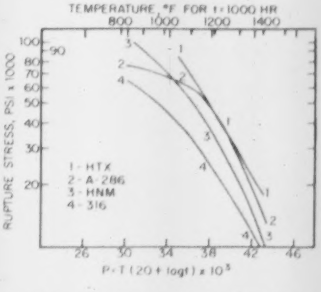
*• An extra copy of this article, and Part II (on martensitic grades) which appears next week, is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



**This is how the strength-density ratios of three stainless steels compare at elevated temperatures**

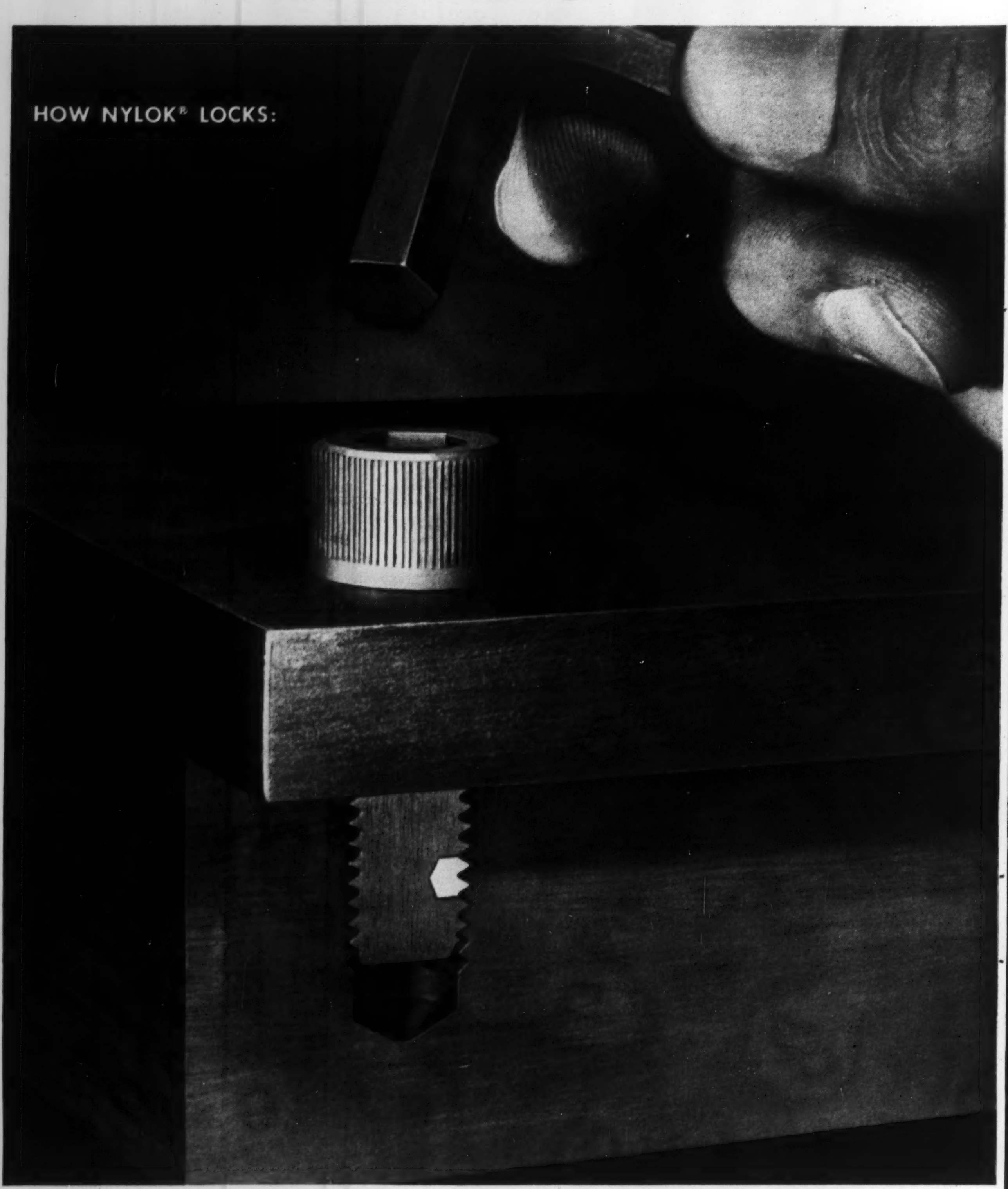


**Yield strengths of three stainless steels at high temperatures. These are used less frequently than ultimate tensile strengths**



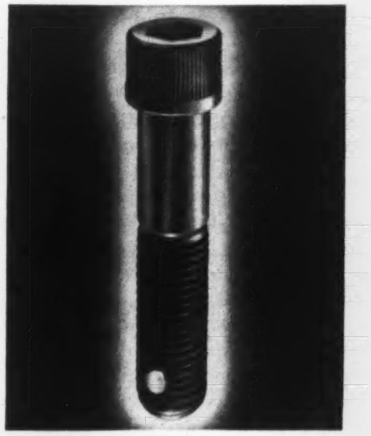
**Master rupture curves for four austenitic steels. Values are indicated in the 900 to 1500°F range**

# NEW—self-locking UNBRAKO



**LOCKED!** The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

# socket head cap screws



Self-locking UNBRAKO socket head cap screw.

**BEFORE ASSEMBLY.** The nylon pellet projects slightly. When assembled, threads will be impressed into it.

**AFTER REMOVAL.** "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

## They won't work loose. And they simplify design and save production time.

UNBRAKO socket head cap screws are now available embodying the Nylok* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

**T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

UNBRAKO SOCKET SCREW DIVISION

**STANDARD PRESSED STEEL CO.**

**SPS**

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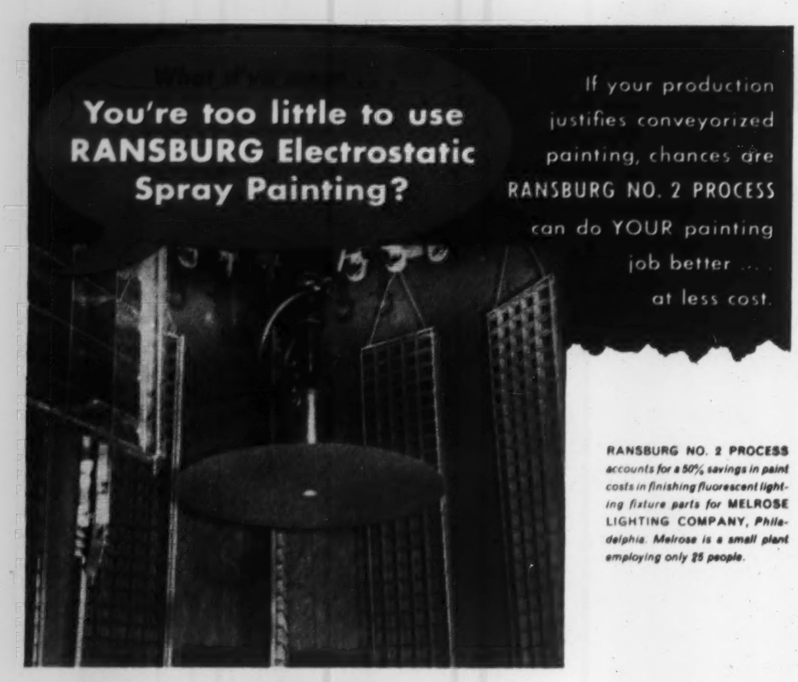


You're too little to use RANSBURG Electrostatic Spray Painting?

If your production justifies conveyorized painting, chances are RANSBURG NO. 2 PROCESS can do YOUR painting job better . . . at less cost.

**RANSBURG NO. 2 PROCESS** *accounts for a 50% savings in paint costs in finishing fluorescent lighting fixture parts for* **MELROSE LIGHTING COMPANY,** *Philadelphia. Melrose is a small plant employing only 25 people.*

**N**ot only big industrial manufacturers like G. E. . . . Whirlpool-Seeger . . . Westinghouse and Republic Steel, but little plants, too, are using RANSBURG NO. 2 PROCESS in their finishing departments to help keep mounting manufacturing costs in line.

A typical example is Melrose Lighting Company, Philadelphia. They make industrial fluorescent lighting fixtures and employ only 25 people.

Formerly, according to F. Homer Hagaman, owner Melrose Lighting, when their fixture louvres were hand sprayed, they painted only 70 pieces per hour. Now, with Ransburg Electro-Spray, he reports they get over 200 per hour.

Production on the fixture end parts jumped from 400 pieces per hour by hand spray to over 2000 an hour electrostatically—a 400% increase!

Along with improving quality of the work, stepping up production, and cutting labor costs, Melrose is enjoying a 50% paint savings.

Let us show you how Ransburg No. 2 Process can lower YOUR painting costs. Write for our new No. 2 Process brochure on electrostatic spray painting. Numerous production-line examples show how other manufacturers are cutting finishing costs . . . increasing production . . . and improving the uniformity and quality of their work with Ransburg equipment.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG

# Welds Auto Parts

## Mounting plates (300 an hour) are welded to bumper guards. Machine adapts to new models

A VERSATILE resistance welder speeds production of 15 models of auto bumper guards at the stamping division of Eaton Mfg. Co., Cleveland.

Designed for rapid tooling change-over, the welder reduces down time to 50 per cent of what it was. Adapters provide for annual model changes.

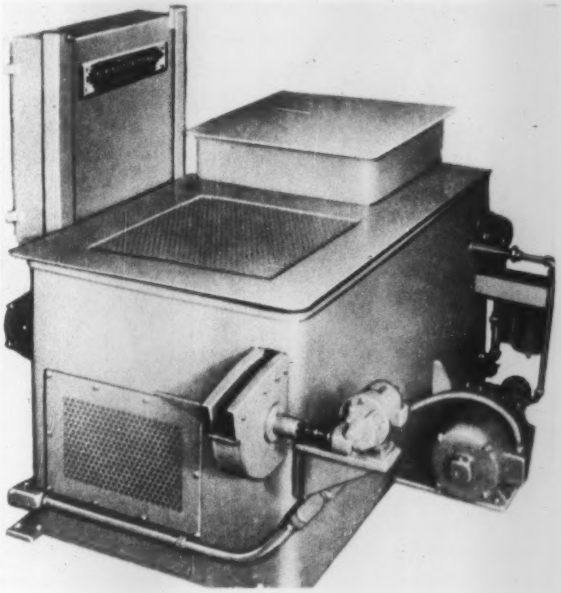
The production rate is 300 bumper guards an hour. Change-over takes only 1 hour. A four-head (Taylor-Winfield) projection welder makes two pairs of welds in rapid sequence. Each operation welds one of the two mounting plates normally joined to the bumper guard shell.

Sequence firing minimizes electrical power demand although the welder can be adjusted to make both welds simultaneously.

For shells that need only one mounting plate, current is fed to only two heads. Separate 2000 kva transformers and electronic controls are used for each head.

Auto bumper guards and mounting plates (top) are projection-welded in the machine shown below

## Gear Washer Will Handle 1000 Parts an Hour



Chips and loose dirt are removed from small parts with this production line machine. It is not limited to gears or round parts.

Parts with major dimensions ranging from a fraction of an inch to about 3 in. can be handled.

Parts may be received by gravity from machines on previous operations, or they may be received from a collecting floor conveyor.

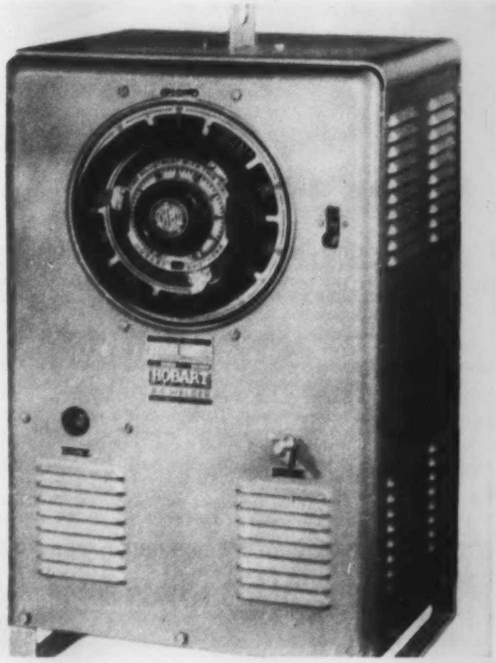
Parts are spray washed and blown dry as they travel 4 ft through the washer.

The machine operates at room temperature. A pump is used to spray the washing solution on the moving parts, and an oversize scavenger pump is used to pull the solution out of the bottom sump and into the top tank.

The scavenger pump assures that there always will be more than enough solution in the top tank for spray washing.

A 1-hp blower dries the parts before they leave the machine. *Write*: Gear-O-Mation Division, Michigan Tool Co., 17140 E. Ten Mile Rd., East Detroit, Mich. *Phone*: Twinbrook 1-3111

## Arc Welder Transformer Has Magnetic Control



This alternating current welder operates on single phase, 60 cycle current. Input is 230 volts.

At 30 volts, output is 295 amperes on a 20 per cent duty cycle, 250 amperes on a 30 per cent duty cycle and 200 amperes on a 50 per cent duty cycle.

Magnetic control of the transformer makes for high efficiency, safety and silent operation.

Five main steps of coarse adjustment (1, 2, 3, 4 and 5) are provided for use in all conventional alternating current welding, as well as for some inert gas welding.

Four additional steps (A, B, C and D) are for use in other inert gas applications. The steps also can be used for downhand welding with E-6013 type electrodes.

A rheostat in the center of the five-range wheel operates in each step to provide a fine adjustment of the arc; an infinite number of welding settings is possible.

The welder is available with capacitors for power factor correction.

The stationary unit is 34⅜-in. high, 19 in. wide, and 18¾-in. deep. Net weight is 215 lb.

Portable mountings are optional. *Write*: Hobart Bros. Co., Hobart Square, Troy, O. *Phone*: 2-1223

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Presenting another NEW
WISCONSIN
HEAVY-DUTY
Air-Cooled
ENGINE
the FULL-POWERED
V-type 4-Cylinder 30 hp. Model VH4

This rugged new engine has been added to the Wisconsin line to fill the horsepower gap between the Model VF4 25 hp. and the Model VG4D 36 hp. Wisconsin Engines. At the same time, the mounting base is dimensionally identical to the Models VE4 and VF4 to permit convenient replacement of the latter engines if greater power is required.

The Model VH4, which now makes its bow for the first time, is the most powerful engine of its type and size available today, in our estimation. It is an engine of basic High Torque design which gives it the important advantage of being able to deliver maximum usable *Lugging Power* that carries the load through the hard, heavy pulls. It has been designed to give you the best possible performance at all engine speeds from 1400 to 2800 rpm., even when operating under intermittent shock-loads or under constant load, continuous service. It is an exceptionally smooth-running, even-firing engine and has all the traditional heavy-duty features that characterize *all* Wisconsin Models, from 3 to 36 hp. — built for hard service at all temperatures up to 140° F.

**Learn more about this new engine. Write for Bulletin S-196 for detailed data and engineering specifications. Also ask for Service Map Bulletin, Form S-198.**

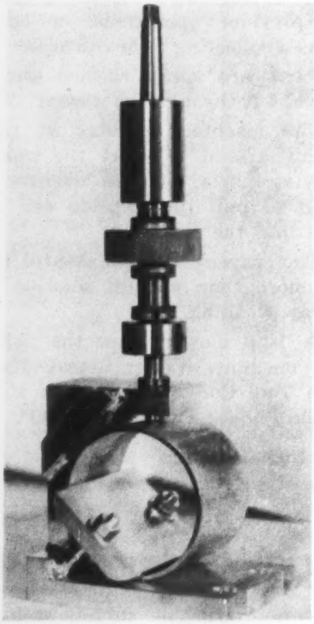
MOST H.P. HOURS
WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

A 6032-½

## Chamfering Tool

This tool will chamfer or deburr holes 3/8 to 3 in. in diameter which are drilled in round parts with diameters of 1 in. and larger.

It will produce any width of chamfer 0.005-in. and larger with any degree of angle, form or radius. Also a true concave or convex surface can be produced inside the hole.

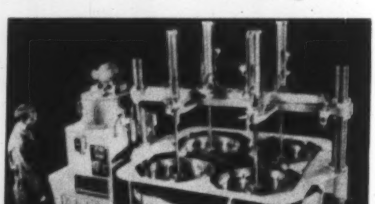


The tool can be used in radial or drill presses. *Write*: Falcon Tool Co., 20771 Ryan Rd., Detroit 34, Mich. *Phone*: Jefferson 6-6242

## Lapping Machine

The model 72 Lapmaster can generate surface flatness to less than one light band and finishes to 2 rms.

An ammeter warns the operator when the machine is being over-



**15,000-VOLT** power cable made by Anaconda installed in underground ducts at site of major chemical company plant.

# How many volts are you from lower operating costs?

The trend in plants today is to bring high voltage—5,000, even 15,000 volts—right up to working areas. The chief advantage: lower operating costs.

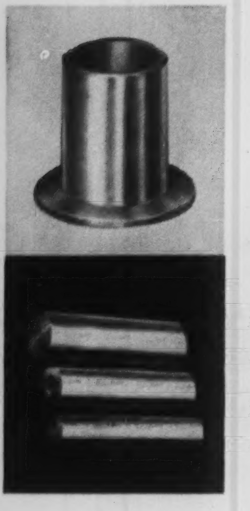
High-voltage distribution means better, more economical performance from motors, lights, furnaces, and other electrical equipment—because it reduces voltage losses in the electrical system.

And, as plants grow—or new processes are added—it enables management to meet new power needs without costly wiring additions.

For high voltage service, Anaconda offers a wide range of cables to fit individual needs. For example: Duralox Interlocked-armor Cable, installed without conduit; Aerial Cable that goes *over* crowded areas; plastic- and rubber-jacketed cable, resistant to water, acids, alkalies, oils.

The Man from Anaconda will be glad to explain more fully the economies of high-voltage operations—and work with your engineers on your cable needs. Offices in 27 major cities—or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. [illegible]

**ASK THE MAN FROM ANACONDA®**
**ABOUT POWER CABLE**



THE

Simplest answer

TO YOUR

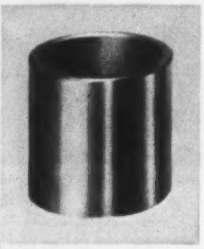
BEARING

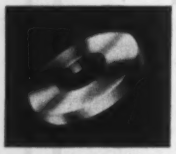
PROBLEMS

The availability of oil-filled, self-lubricating sintered powdered Bronze Bearings is greatly enlarged by the many sizes that are included in the new Bunting Standardized sintered Bronze stock line. Chemical and physical specifications of these Bunting stock bearings are ASTM-B202 Type I, Class A. The material also meets the requirements of SAE Type I Class A, AMS-4805 and MIL-B-5687A Type I Comp A. The basic composition is 90% copper and 10% tin of high purity.

This high quality powdered bronze with built-in lubrication together with Bunting Cast Bronze Bearings made of Bunting No. 72 Bronze (SAE-660) give mechanical production and maintenance the means of finding the simplest, best and most economical answer to any bearing problem.

BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.





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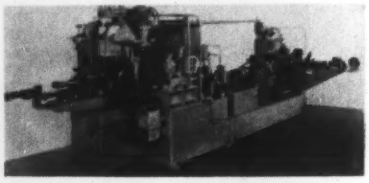
loaded. Its capacity ranges from four parts 27 in. in diameter to 2480 parts 1 in. in diameter.

The roller bar is supported so that it can be stacked with parts during loading or unloading. *Write*: Department SLC, Crane Packing Co., 6400 Oakton St., Morton Grove, Ill. *Phone*: Orchard 3-6800

## Forming Machine

Wire basket assemblies are made from bulk wire by this automated machine. It does welding, trimming, cutting and forming.



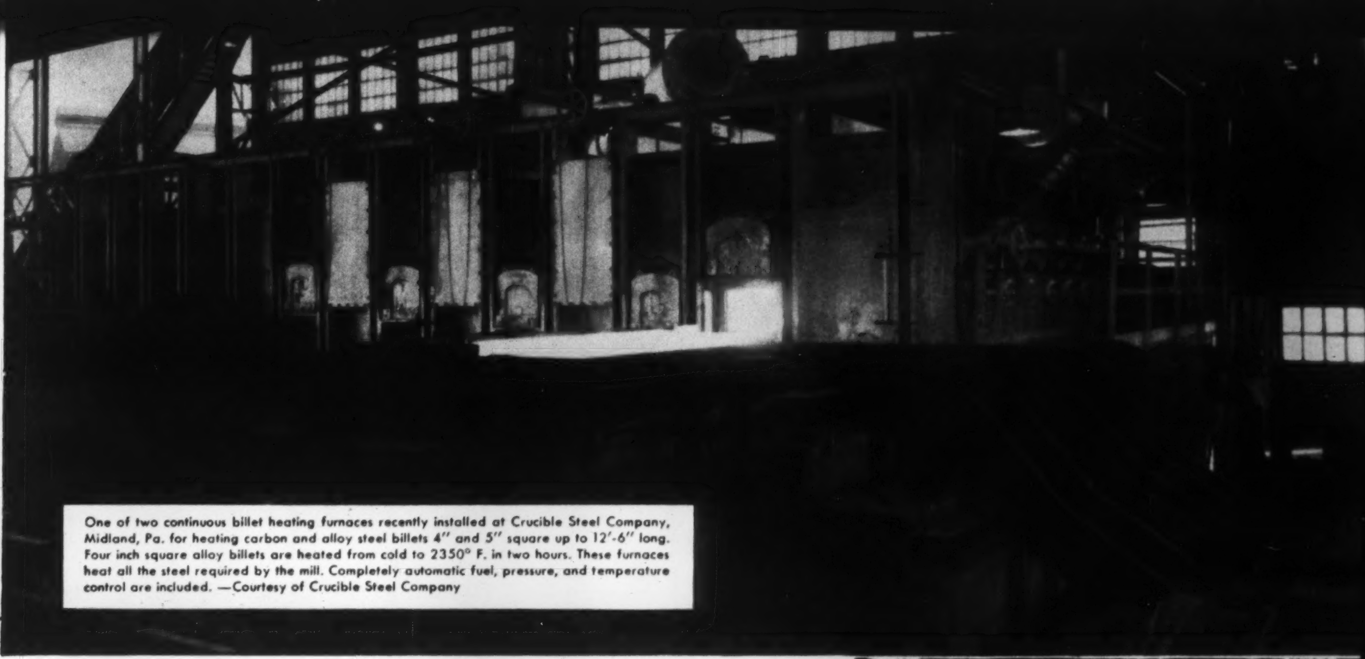
Wires are drawn directly into the machine from stationary stock coils. An intermittently operated feed mechanism advances the wire through various operations.

The wires are straightened, welded into a continuous strip pattern, which is then notched, trimmed and formed into finished basket assemblies by a bending device. *Write*: Expert Automation Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

## Gear Checker

Model 481 inspects parallelism and tooth spacing of gears $1/4$ to $2\frac{3}{4}$-in. in face width and $1/2$ to 14 in. in diameter.

A recorder chart is graduated in 0.0001 in. Pens actuated by carbide checking fingers use different



One of two continuous billet heating furnaces recently installed at Crucible Steel Company, Midland, Pa. for heating carbon and alloy steel billets 4" and 5" square up to 12'-6" long. Four inch square alloy billets are heated from cold to 2350° F. in two hours. These furnaces heat all the steel required by the mill. Completely automatic fuel, pressure, and temperature control are included. —Courtesy of Crucible Steel Company

# DEPENDABLE UP-TO-DATE DESIGN and OPERATION...

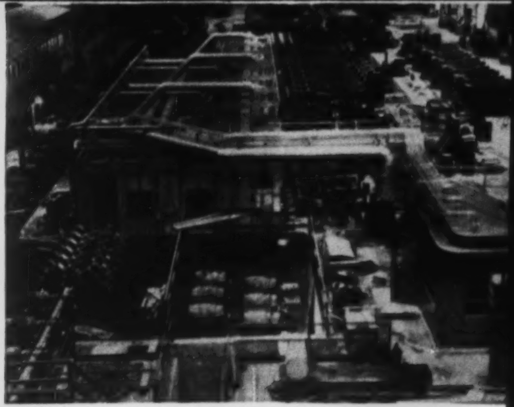
## with Loftus Continuous Heating Furnaces for

## Blooms • Slabs • Billets • Tube

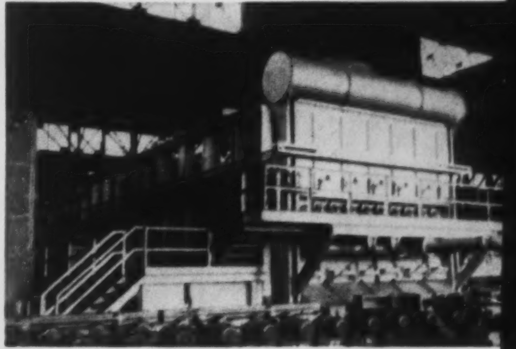
Long years of experience by Loftus engineers in continuous heating furnace design and construction, coupled with practical innovations developed in recent installations produce dependable, trouble-free furnaces fitted to present day, cost cutting requirements. Loftus continuous heating furnaces are famous for operating efficiency, ease of maintenance, and outstanding availability. Throughout the world, Loftus engineers have designed and built one, two, and three zone installations utilizing all types of fuel. You can rely on Loftus to give you the best quality heating at lowest cost possible in your area.

*A consultation with Loftus engineers can pay big dividends . . . Call or write*—Today!

**Oil and gas-fired melting, heating and heat-treating furnaces of every type and description for ferrous and non-ferrous materials producing and processing.**



Continuous 75 ton per hour tube reheating furnace installed in one of the largest tube mills in this country. Heats up to 271 pieces per hour of 3½ to 4⅞ inch O. D. pipe up to 65 feet long, to 1850° F. Three zone combustion control heats the tubes uniformly for further processing. Eighteen long flame burners located on each side wall burn coke oven or natural gas.



Continuous 50 metric ton per hour slab heating furnace recently installed in a Japanese steel plant for heating steel slabs 4½" x 24" x 13'-6". *Slabs are heated from cold to 2360° F. in 1½ hours.* Furnace is equipped with two zone, top and bottom oil-fired burners with screening burners on the discharge end. Two built-in tile recuperator cells of 5000 sq. ft. total heating surface, preheat the combustion air to approximately 725° F. This furnace was designed to achieve highest possible heat recovery, due to excessively high fuel cost in Japan.

**Loftus ENGINEERING CORPORATION**
Designers and Builders of Industrial Furnaces

**610 Smithfield Street, Pittsburgh 22, Pennsylvania**
**140 S. Dearborn Street, Chicago, Illinois**

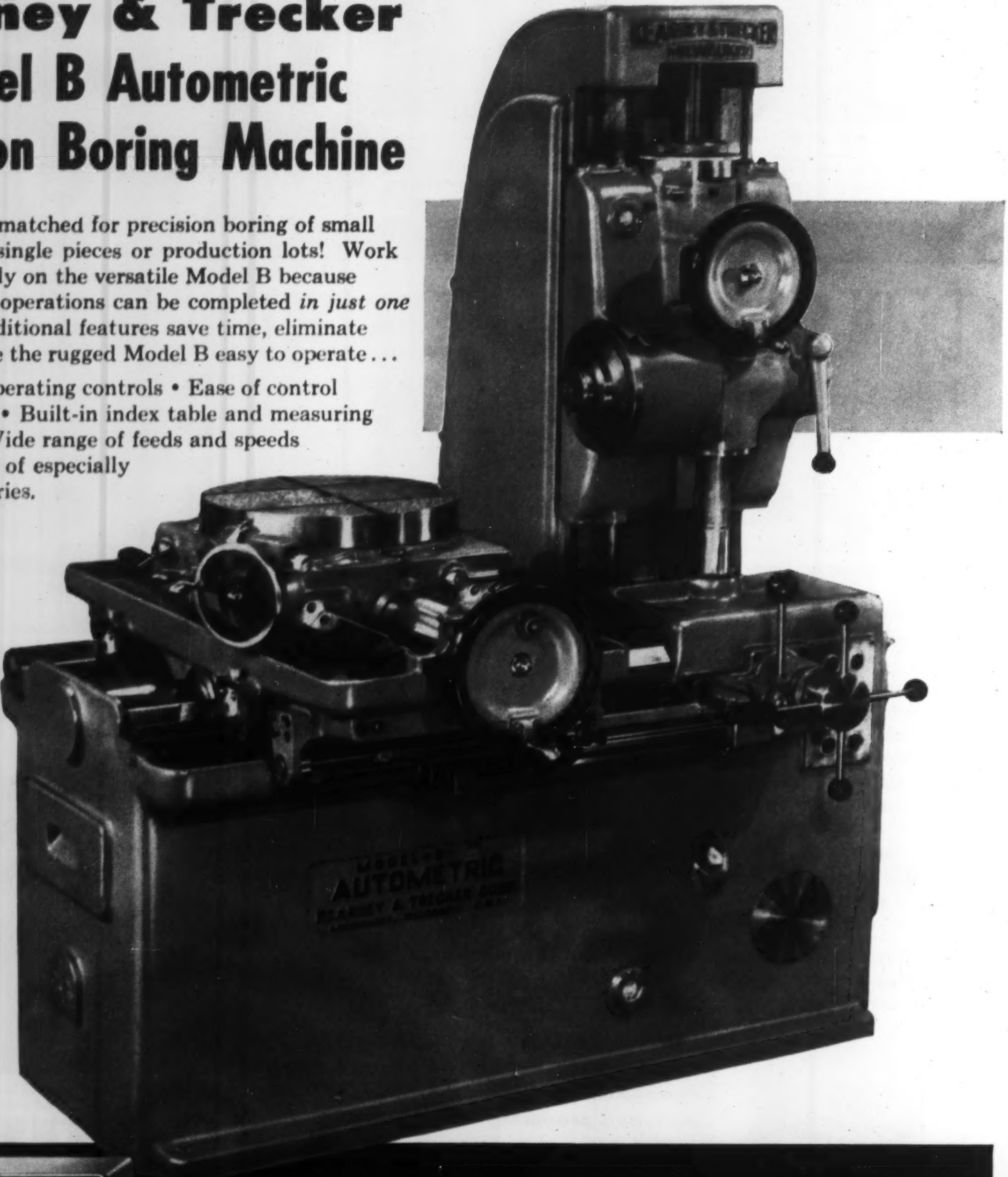
# Speed Precision Boring

## and maintain accuracy of .0002" in 12" with the

## Kearney & Trecker Model B Autometric Precision Boring Machine

Here it is . . . unmatched for precision boring of small work . . . either single pieces or production lots! Work progresses rapidly on the versatile Model B because multiple boring operations can be completed *in just one setup.* These additional features save time, eliminate errors, and make the rugged Model B easy to operate . . .

Convenient operating controls • Ease of control • Ease of setup • Built-in index table and measuring instruments • Wide range of feeds and speeds • Complete line of especially selected accessories.



Model B Autometric: 16" dia. table; 10" Vert. Travel; 16" Transverse Travel; 15" Carriage Travel; 8 speed changes—.0005" to .0148" per Spindle rev.; 50 to 2500 rpm. For complete details, ask for Catalog No. BMA-10.

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104 Boulder Bldg.
19 West 10th Street

**WICHITA, KAN.**
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301 N. St. Francis

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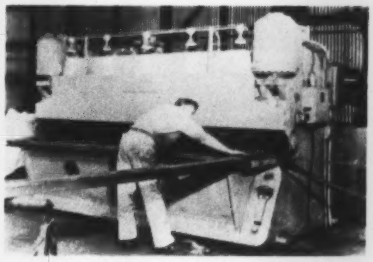
MILWAUKEE

colored inks to make it easy to take readings from the record.

The automatic cycle takes 5 seconds to check a tooth. The checker can be set to check a certain number or combination of teeth and skip the rest. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

## Hydraulic Shear

This gap-type shear can cut sheet metal twice its own length. Oversize sheet or heavy plate is cut noiselessly, accurately and rapidly.



Any piece between 20 gage and full capacity can be sheared with a single setting of blade clearance. Narrow strips of fine edges can be trimmed from plates or sheets.

The shear does not mark soft aluminum or polished stainless steel. *Write*: Pacific Industrial Mfg. Co., 848 49th Ave., Oakland 1, Calif. *Phone*: Andover 1-8303

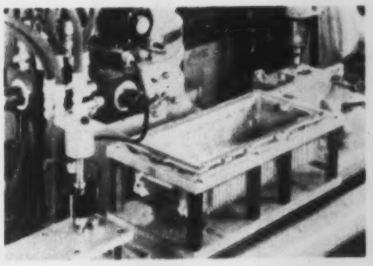
## Automatic Tracing

Here's a magnetic sensing type stylus which will automatically reproduce a closed two-dimensional or 360-degree contour. All the operator need control is the setting of maximum feed rates.

The unit can be adapted to any standard milling machine. Tracer control movements are through hydraulic cylinders which replace the machine's feed screws on table and saddle.

The tracer is mounted on a swivel-type overarm. This provides a wide range of settings between the tracer and vertical spindle to accommodate large workpieces.

The operator can machine pockets to a predetermined depth with an oversized tracer stylus under hand control, then finish out the periphery of the pocket by using the tracer control as an automatic, 360-degree, pencil-type unit. *Write*: Turchan Follower Machine Co., 8259 Livernois Ave., Detroit 4, Mich. *Phone*: Webster 3-6484

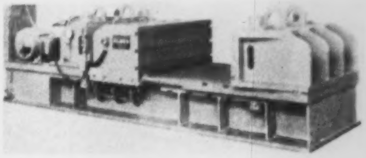


## Bending Machine

The 200-ton Bulldozer is used for heavy bending and forming. The portable unit operates automatically or semiautomatically.

Slide ways are hardened steel, and the bed is protected by hardened steel wear plates which are reversible.

Presetting the press stroke is not necessary. To change jobs, the operator simply changes dies. The opening is adjustable between 12 and 60 in.



Speeds: Advance 140 ipm, press 41 ipm, return 285 ipm. *Write*: Elmes Engineering Division, American Steel Foundries, 1150-X Tennessee Ave., Cincinnati 29, O. *Phone*: Redwood 1-9210

## Tube Furnace

This high temperature unit is large enough for production work as well as laboratory analysis. The working chamber is 27 in. long and will accommodate tubes up to 5 in. OD.

Working temperatures range from 1700 to 2600° F. For greater uniformity, silicon carbide heating elements are arranged perpendicular to the tube, above and below the furnace chamber.

Three zones of temperature control enable the operator to pro-

DURASPUN

20-FOOT FURNACE ROLLS
Centrifugally Cast

. . . of Duraloy HH Alloy, one of the most widely used high chrome, medium nickel alloys.

Two items concerning these furnace rolls may be of particular interest:

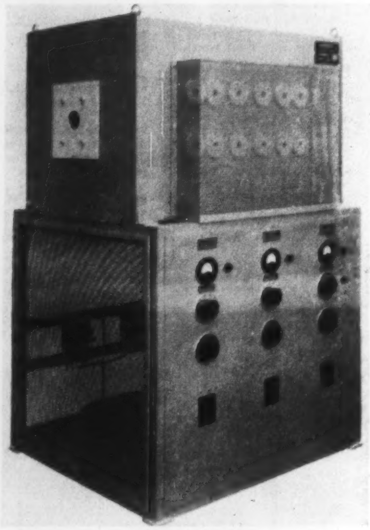
a—the size: 20 feet long—14" OD, ¾" wall thickness

b—welding operations by which reducing cones and shafts (both statically cast of the same alloy) were welded to the centrifugally cast rolls

These two items will serve to emphasize two phases of our service: (1) the large size centrifugally cast tubes we are able to produce and (2) our machining and finishing facilities, including welding.

Our new 16-page general Bulletin — 3354-G — gives complete details. Would you like a copy? When writing or calling would you mind telling us the general nature of your high alloy casting requirements? Better yet, if you have specific requirements on which we could help, let us have the details.

THE DURALOY COMPANY
OFFICE AND PLANT Scottdale, Pa.
EASTERN OFFICE 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE [illegible] South Michigan Avenue



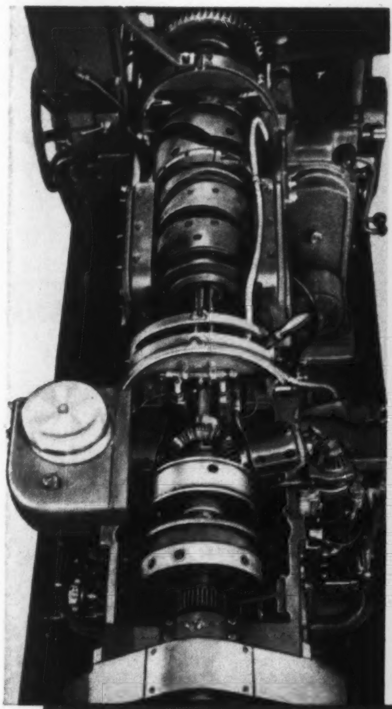
duce variable heating conditions. Each zone is regulated by its own tap-changing transformer with 36 steps of input control.

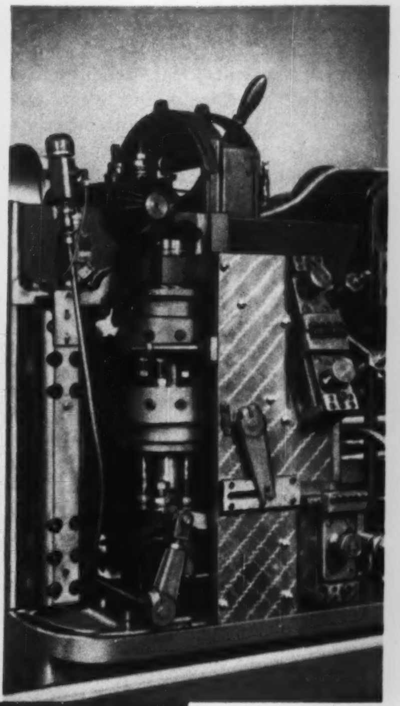
Efficiency is assured by three layers of graded insulation. *Write*: Hevi Duty Electric Co., Milwaukee 1, Wis. *Phone*: West 3-2756

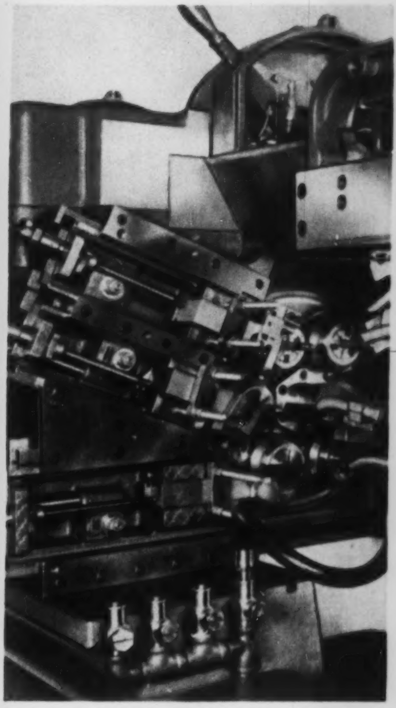
## Recording Gage

This adjustable gage continuously measures the thickness of strip stock being fed to punch presses. Its range: 0.15 to 0.100 in. thick, 5 to 18 in. wide.

The portable gage is placed between the feed roll and the press. Response is dampened delib-





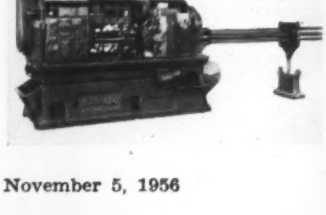


## Seven Fast Changeover Models

With the prospects of improved tool materials ever decreasing the actual machining time of work on Multiple Spindle Automatics, long runs tend to become short runs. Facility that decreases the time for job changes becomes more important to low-cost production.

Conomatics are available in as many as seven fast changeover models. These are the 9⁄16", 1", 1⅝" Sixes, and the 2⅝", 3½", 5", and 5¼" Fours.

These models are equipped with dial adjustment of working stroke of all slides, without making necessary change of total stroke or positive stop settings. Write, wire, or phone for literature descriptive of these features and other facilities available to users, or prospective users.



# Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

TMI STAINLESS STEEL
TUBING HAS
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NEARLY 10 MILES OF TMI TUBING IS PROVING ITS WORTH ON THE NAUTILUS!

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TMI TUBING IS BASIC IN AMERICA'S FIRST COMMERCIAL NUCLEAR ENERGY ELECTRIC POWER PLANT!

The Mark of Quality TMI

• *TMI's Atomic Experience is at your service from the initial plans to the final proven specifications. Specializing in stainless steel and special alloy tubing—in small diameters, .050" to .625" O.D. with tolerances as close as .001" when required.*

**TUBE METHODS INC.**

METALLURGISTS • ENGINEERS • MANUFACTURERS

BRIDGEPORT (Montgomery County), PA

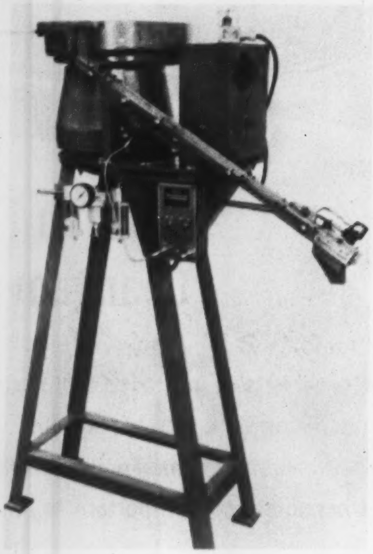
erately so that local irregularities will not show and the gage will see an average stock thickness.

The recorder chart provides a permanent record of thickness variation. *Write*: Federal Products Corp., 1144 Eddy St., Providence 1, R. I. *Phone*: Stuart 1-9300

## Automatic Feeder

Eyebolts, setscrews, thumbscrews, hook bolts, studs, pins and other headless or nonsymmetrical headed parts are handled by this line of thread roller feeders.

The machine can be adjusted to handle parts 6 in. long.



A vibratory unit feeds parts down a track to an escapement that orients them shank first.

The feeder is synchronized with a roll thread machine. It handles up to 75 pieces a minute. *Write*: Automation Development Corp., 38845 Mentor Ave., Willoughby, O. *Phone*: Willoughby 2-8300

## Electronic Gage

Internal dimensions from 5 to 36 in. can be inspected quickly to within several millionths of an inch with the Internal Calibrating Master.

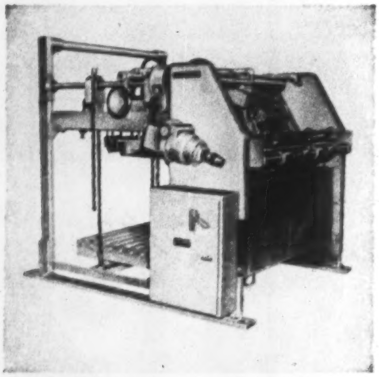
The tool consists of a cylindrical gage handle with a plastic grip that has a gage cartridge mounted

DEXTER
AUTOMATIC
METAL SHEET
FEEDER

**Metal sheets,** automatically separated, picked up and advanced one at a time to feeding—in point of machine to which it is attached at speeds up to 150 sheets per minute.

Should two sheets adhere, they are automatically transferred to a reject tray. Rubber suction mouthpieces and drop rollers prevent scratching.

**Standard Feeder** handles metal sheets from 14" x 18" up to 36" x 44" between 24 and 38 gauge stock. Feeders for larger size and heavier gauge metal sheets also available.



**Continuous reloading** avoids machine stoppage. New loads are placed in feeding position, while machine is operating, thus maintaining continuous automation cycle.

Dexter Feeder may be attached to Metal Litho Presses, Coating Machines, Sorting Machines, Shears, Slitters, Sprayers, Punch Presses, Stove Pipe Machines, Buffers and numerous other metal working machines.

Custom built sheet feeders for handling paper, cardboard, corrugated and other types of sheets are available to meet specific requirements. Inquiries invited.

DEXTER
EST. 1880
DEXTER
FOLDER COMPANY
*General Sales Offices*
330 WEST 42ND STREET
NEW YORK 36, N. Y.

in one end and an adjustable and interchangeable screw assembly at the other.

A series of bars of different lengths (they're ⅝-in. in diameter) thread into the gage handle to provide the wide adjustment range. *Write*: Sheffield Corp., Dayton 1, O. *Phone*: Kenmore 3131

## Aluminum Paint

This material will withstand 1700°F without blistering or burning.

It is made of a clear silicone base with a special aluminum flake pigment. Air drying to a bright finish takes about 30 minutes. When heated, the paint virtually fuses with the surface.

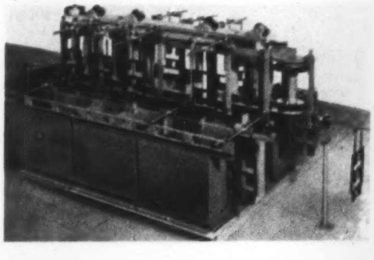
The coating resists moisture, corrosion, mild acids, alkalis and industrial fumes.

It can be applied by brush or spray gun. *Write*: Chem Industrial Co., 3784 Ridge Rd., Brooklyn 9, O. *Phone*: Olympic 1-4323

## Automatic Plating

Cycleflex is an automatic plating and anodizing machine that eliminates the need for overhauls during cycle changing.

Safety devices eliminate malfunction of the conveyor, make it



CASH IN YOUR CHIPS

Change Metal Turnings Waste
into More Profitable Shoveling CHIPS

American
METAL TURNINGS
CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: $4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

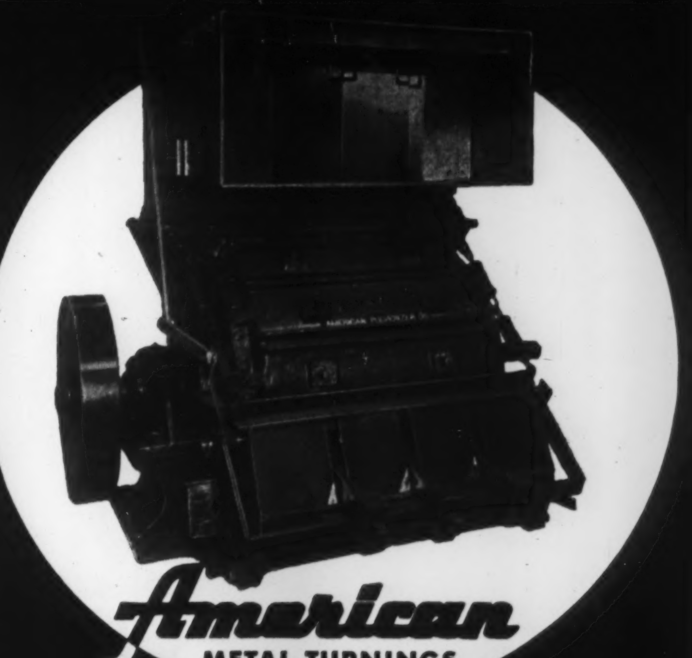
*How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .*

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year........................$ 960.00
(20 tons/month at $4 extra per ton)
6,000 Gallons Recovered Cutting Oil at 30¢/Gal...........$1,800.00
(50 gals. per ton x 240 tons = 12,000 gals. Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.........$ 300.00
TOTAL GROSS PROFIT $3,060.00

WRITE for Metal Turnings Crusher Bulletin.

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers
1539 MACKLIND AVE. • ST. LOUIS 10, MO.



*Logan Roller Conveyor in machine tool plant. Gate sections in foreground provide passageway through assembly line and step plates between rolls allow easy access for operators to work stations. Transfer car handles incoming sub-assemblies.*

The LEADERS use Logan

INLAND MFG. DIV.
INLAND STEEL CORP.
INTERNATIONAL HARV. CO.
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JERNBERG FORGINGS CO.
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(cont.)
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Small business today . . . large business tomorrow. In this country we don't have to "stay put." Development and growth are characteristics of American industrial leaders. An important factor is the insistence on highly efficient material handling methods. Take Logan Conveyors. The nation's foremost industries use this equipment to step up production tempo, enlarge capacity, improve deliveries, conserve manpower. These are Logan functions which you, too, can use profitably. Write for nearest engineer or for further information.

LOGAN CO., 535 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

impossible to push racks into the side of the tank and prevent loads from dropping if power should fail during work transfer.

Removable rack carriers leave tank surfaces clear for easier servicing and manual plating of large pieces. *Write*: Lasalco Inc., 2818 LaSalle St., St. Louis 4, Mo. *Phone*: Prospect 1-2990

## Press Control

The Flexetrol arm makes the press operator's job easier and contributes to his safety and efficiency.

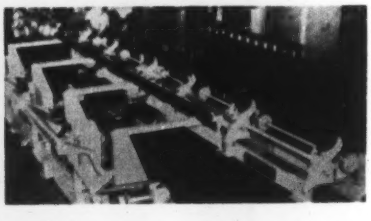
Operating buttons can be repositioned quickly for top efficiency on each job.

Proper control arrangement is provided for a tall operator and for the short one who may take his place on the next shift. *Write*: Clearing Machine Corp., division of U.S. Industries Inc., 6499 W. 65th St., Chicago 38, Ill. *Phone*: Portsmouth 7-8700

## Automatic Feeding

From 120 to 480 pipes an hour can be handled automatically by this equipment for upsetting operations. Only the upsetting itself requires manual control.

Pipe is received from a skid,



# Your Wickwire Rope Distributor and our sales engineer ... a helpful team

CF&I

WICKWIRE
ROPE
A
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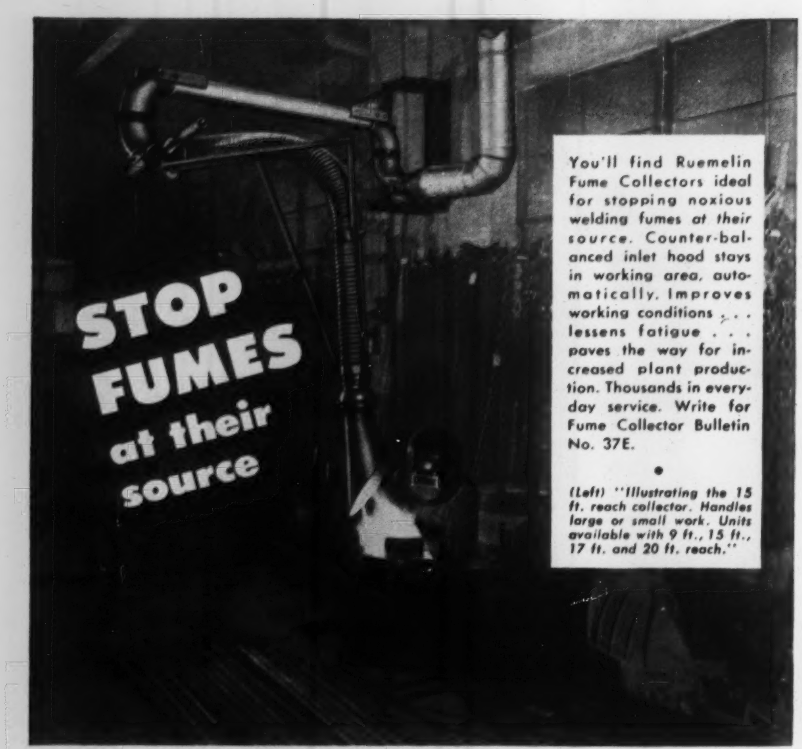
This sales engineer—an expert on the selection, installation and maintenance of our products—is with your Wickwire Rope Distributor every time he makes a call.

True, sometimes he's hundreds of miles away, working in the field or at the mill. Yet, even if he's not there in person, your Wickwire Distributor has the full assurance that sales engineers such as this one are *always* quickly available to help you.

It's just one more reason why your Wickwire Distributor knows he's got top-quality wire rope, slings and strand to sell . . . and that these products will serve you well.

4084

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION



You'll find Ruemelin Fume Collectors ideal for stopping noxious welding fumes at their source. Counter-balanced inlet hood stays in working area, automatically. Improves working conditions . . . lessens fatigue . . . paves the way for increased plant production. Thousands in everyday service. Write for Fume Collector Bulletin No. 37E.

•

(Left) "Illustrating the 15 ft. reach collector. Handles large or small work. Units available with 9 ft., 15 ft., 17 ft. and 20 ft. reach."

**RUEMELIN MFG. CO.**

MFRS. & ENGRS. • SAND BLAST & DUST COLLECTING EQUIPMENT
3882 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

A 8400-1/[illegible]

**Why STERLINGS are MAN'S BEST Materials-Handling FRIEND!**

ONLY 1/5th OF LOAD HERE
4/5ths OF LOAD HERE

1. **ALWAYS READY** to use . . . no fuel or other "operating supplies" needed.
2. **NO "STARTING"** Problems . . . regardless of cold, heat, rain, dust.
3. **NO "HOUSING"** Problems . . . no protective warehousing needed, no covering, no "babying".
4. **NO MAINTENANCE** Problems . . . nothing to get out of order . . . rugged, long-lasting.
5. **EASIEST WHEELING** . . . with choice of pneumatic, semi-pneumatic or steel-tired wheels (with plain, ball or roller bearings.) These are the easiest rolling wheelbarrows made!
6. **EASIEST** on the barrow man . . . engineered to balance ⅘th of load on the wheel; only ⅕th of load at handle grips.
7. **EASIEST CLEANEST-DUMPING** . . . steel trays engineered to unload completely, with least effort.

Costs Less per Year

Ask about liberal dealer sales plan

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A 8245-⅓

aligned and positioned so that the desired length enters the slot-type reheating furnace. The pipe is carried at a controlled speed through the furnace, is withdrawn and then centered and fed into the first stage of a two-stage upsetter. It is then elevated into the second stage, withdrawn and dropped into a cradle.

When the pipe is to be upset at both ends, the cradle is by-passed and the pipe is carried to a second assembly. *Write*: York-Gillespie Mfg. Co., Pittsburgh, Pa. *Phone*: Museum 1-9737

## Lift Truck

Here is a 6000-lb electric truck that needs only 6 ft of clearance, yet seats the operator so that his head is below the top of the mast.

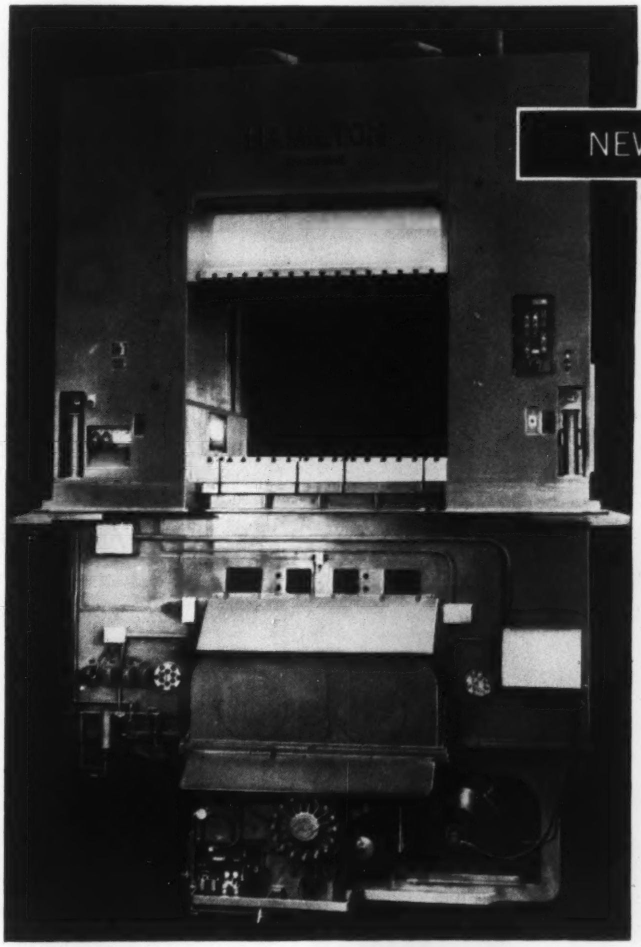
Turning radius is 99 in. Maximum lift is 97 in. With a full load, the truck travels at 4 mph. *Write*: Baker-Raulang Co., 1250 W. 80th St., Cleveland, O. *Phone*: Olympic 1-3000

## Automatic Control

This tracer attachment automatically controls a vertical milling machine.

Range and capacity are not limited by the automatic control. Under normal machining conditions, depth of cut can be controlled to within ±0.001 in.

The stylus which governs vertical movement of the table is set



NEWS FROM HAMILTON!

# New 500-4000 ton underdrive draw press "package"...

for fast easy installation...
simplified maintenance...
smooth, safe drawing...
more productive strokes per minute

Thirty years the leader in the mechanical press field, Hamilton now gives you this latest product of dynamic press know-how. An all-new line of 500 to 4000 ton mechanical draw presses engineered for fast, safe drawing operation . . . with each press a "package unit" for quick installation, easy maintenance.

- *Package design* keeps all piping and wiring within the rugged, welded steel press structure. Installation is quick and easy.
- *Hamilton's Exclusive Double-Lube system* provides both pressure and gravity flow lubrication to all bearings.
- *Operating mechanism in the press bed* simplifies inspection and maintenance during operations.
- *Variable cycle sequences* insure more productive strokes per minute.
- *Swivel arrangement of counterbalance cylinders* insures proper alignment when gibs are adjusted.

You'll speed your production while you slash installation and operating costs . . . with these new Hamilton underdrive presses in your shop. They're designed and built to handle your toughest jobs better, faster—with far less downtime. Get the full story today! Write for complete specifications to Dept. 9677, Hamilton Division, BLH Corp., Hamilton, Ohio.

BALDWIN
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**HAMILTON DIVISION**
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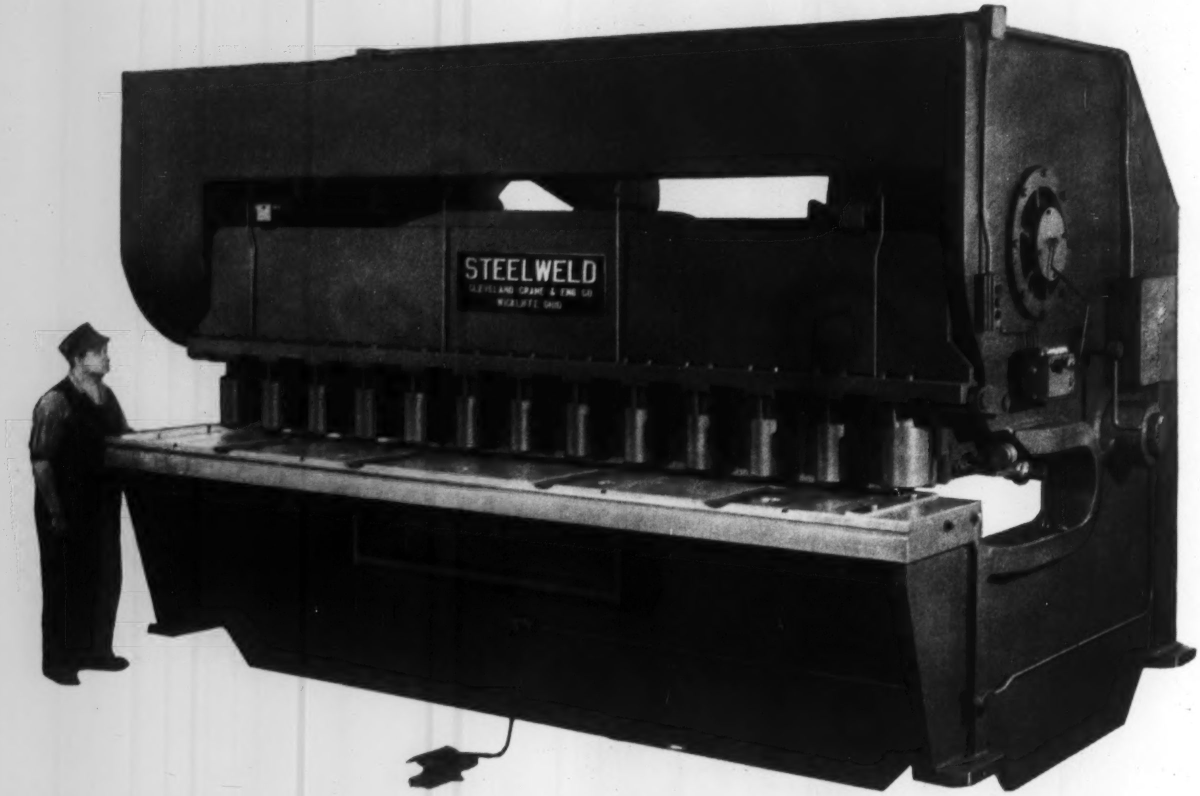


# CUTS 12 FEET 3/4 INCH STEEL PLATE

## *at 30 Strokes Per Minute*

### SOME FEATURES OF THIS SHEAR

1. Cuts by pivoted-blade principle.
2. Operated by electric foot switch.
3. Knife clearance adjusted by hand crank and dial indicator.
4. 36-inch throat permits slitting wide plate.
5. Lift-up type back gauge on ball bearings.
6. Heavy all-welded one-piece steel frame.

This is one of a complete line of Steelweld Pivoted-Blade Shears for cutting plate of all thicknesses from ¼-inch to 1½-inch and for lengths from 6 feet to 26 feet.

Steelweld Shears are radically different from all other shears now on the market. They have features never before possible. The revolutionary pivoted-blade travels in a circular path and overcomes handicaps of ordinary guillotine-type shears.

Not only are these machines easier to operate but their design assures smooth straight accurate cuts with minimum plate distortion. Their construction is extra heavy, and all modern features are incorporated to provide for ease of operation, minimum maintenance and long life.

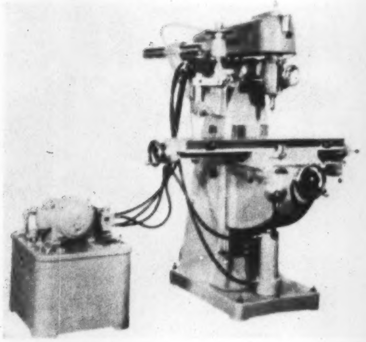
*Get the facts on these outstanding machines.*

*GET THIS BOOK!*

**CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.**

THE CLEVELAND CRANE & ENGINEERING CO.
*7810 East 282nd Street, Wickliffe, Ohio*

**STEELWELD PIVOTED BLADE SHEARS**

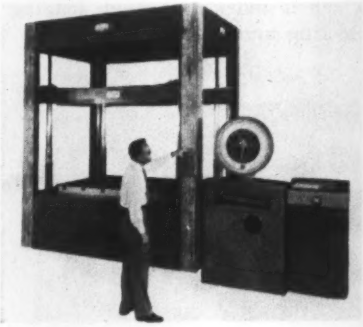


in the same plane as the milling machine spindle. *Write*: U.S. Burke Machine Tool Division, Cincinnati Mfg. Corp., Cincinnati 9, O. *Phone*: Bramble 5000

## Compression Testing

This unit has an electronically controlled graphic recorder which plots an X-Y co-ordinate curve of deflection versus loading.

Speed of the upper platen can be adjusted from 0.2 to 40 ipm. The 72-in. stroke of the upper platen provides ample working space between platens.



Capacity is 17,000 lb. *Write*: Toledo Scale Co., Toledo 1, O. *Phone*: Kingwood 5441

## Electronic Tractor

No operator is needed for the Guide-O-Matic industrial tractor. It is guided by a painted white line or a white tape on the floor.

Light from a bulb in the sniffer box reflects from the paint or tape and actuates photoelectric cells.

The tractor steers accurately in the direction of the line at all

Michigan
Electric Resistance
WELDED
STEEL
TUBING
Always makes possible Better products at lower Cost

CONDENSER TUBE for WASHER-DRYER

ROUND
¼ to 4 O.D. 7 to 22 gauge

| SQUARE | Gauge | RECTANGULAR |
|---|---|---|
| ¼ to ½ | 16 thru 22 | ½" minimum side to 5 maximum side |
| ½ to 1 | 11 thru 22 | |
| 1 to 2 | 11 thru 20 | |
| 2 to 3 | 11 thru 18 | |

Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I.D. and O.D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

A [illegible]nant component of a new combination washer-dryer now on the market is this condenser tube fabricated by Michigan.

In the manufacture of this important tubular part, which helped make possible a major forward step in the development of an appliance for better living, Michigan engineers were required to solve a difficult production problem. The utmost design skill and fabrication accuracy were essential.

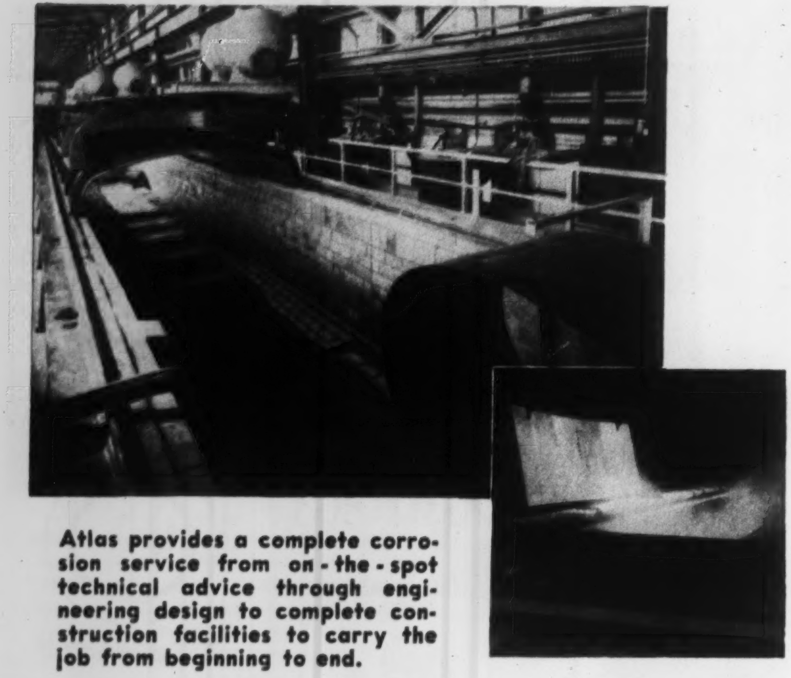
Refer to the drawing and note the expansion required for this part and the spiral bead—operations commonly and efficiently performed with Michigan's modern fabricating equipment. The bracket is projection welded to the tube in a single high production operation—another typical example why Michigan engineers and production workers cannot be excelled in the quantity manufacture of intricate tubular products at low cost.

Always consult Michigan first on any special tubular job requiring the greatest accuracy of product and economy of manufacture.

Michigan STEEL TUBE PRODUCTS CO.
THE OLDEST NAME IN ELECTRIC RESISTANCE WELDED STEEL TUBING
Nearly 40 Years in the Business
9450 BUFFALO ST. • DETROIT 12, MICH.
FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—Service Steel Div., Van Pelt Corp., Los Angeles, Calif.—Donald A. Harston, Cleveland, Ohio—Globe Supply Co,. Denver, Colo.—W. A. McMichaels Co., Upper Darby, Pa.—William P. Hall & Associates, Dayton, Ohio—John Emery West, Miami, Florida—Gary A. Osborn Buffalo, N. Y.—Earle M. Jorgensen Co., Houston, Texas

ATLAS
PICKLING TANKS
in service to stay



Atlas provides a complete corrosion service from on-the-spot technical advice through engineering design to complete construction facilities to carry the job from beginning to end.

When you install pickling tanks, you have a right to expect them to deliver service in full measure. You can't get it if these units are the cause of lost production due to down time for repair of corrosion damage.

Pickling tanks of Atlas construction reduce down time to a minimum, because Atlas cements, coatings and linings are designed to handle the rugged abuse of modern pickling.

For a quarter century Atlas has been producing Corrosion-Resistant materials of construction for industry-wide use in combatting corrosion. Atlas, with the advance of technical knowledge, has developed new materials and improved existing products to keep pace with the increasing use of strong pickling agents and higher processing temperatures.

Now Atlas can offer the most complete line of quality corrosion-proof materials available. Your pickling tanks will become a permanent asset when you make sure that ATLAS CORROSION-PROOF CEMENTS, COATINGS, and LININGS are specified.

*Write for your copy of Atlas Bulletin CC#3 containing informative data on the complete Atlas line.*

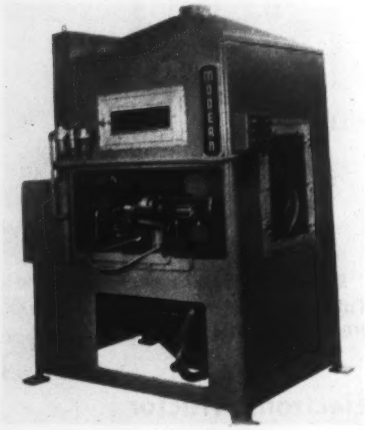
ATLAS MINERAL
PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

times. *Write*: Barrett - Cravens Co., 628 Dundee Rd., Northbrook, Ill. *Phone*: 2300

## Deburring

The Burr-Blaster can deburr from 250 to 350 machined parts in an hour. It removes all fragmentary burrs—those not caused by upsetting of metal—from cast iron or nonferrous parts.

Parts are rotated in the blasting stream by a Neoprene mandrel which is indexed through loading, blasting and unloading.



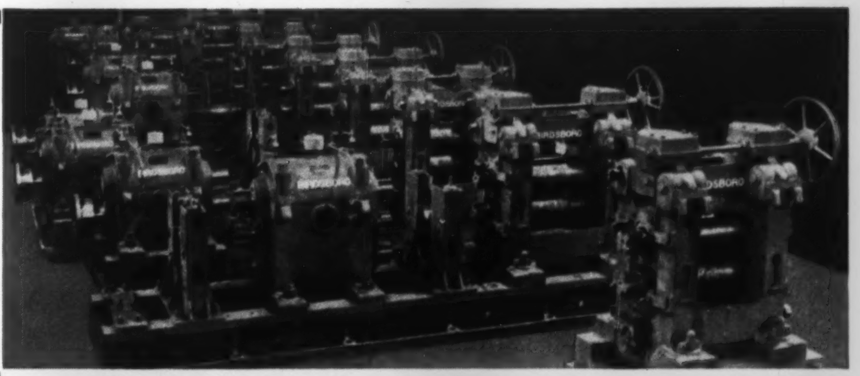
Machines operate on normal plant air pressures. Air consumption per gun is 26 cfm at 70 psi.

Loading and unloading can be manual or automatic. An operator is not needed for an automatic installation. *Write*: Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. *Phone*: Webster 3-7280

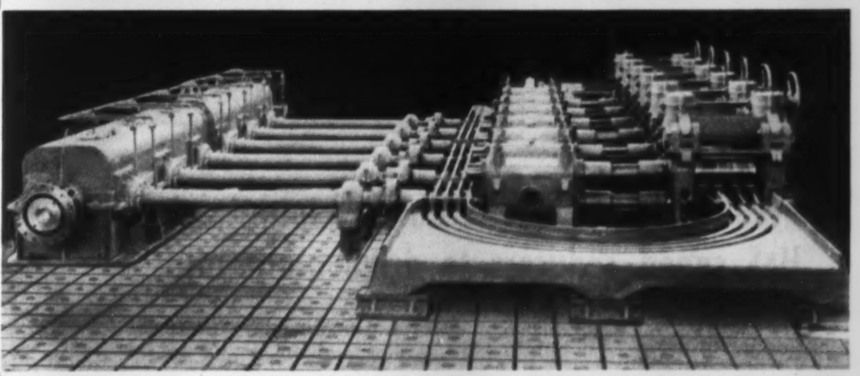
Put Your Steel Production **Ideas** Into Action Through BIRDSBORO

Right now, you have ideas on how production from your mill can be increased, quality improved or savings made. This may be the time to think about putting them to work. When you do, call in BIRDSBORO, specialists in *customized* mill machinery. Direct our large and varied facilities toward *your* goals. Take advantage of production experience that has included many of the most important advancements in the industry. The first step . . . contact your BIRDSBORO representative.

**Roll Stands and Pinion Stands for 10" Rod Mill**



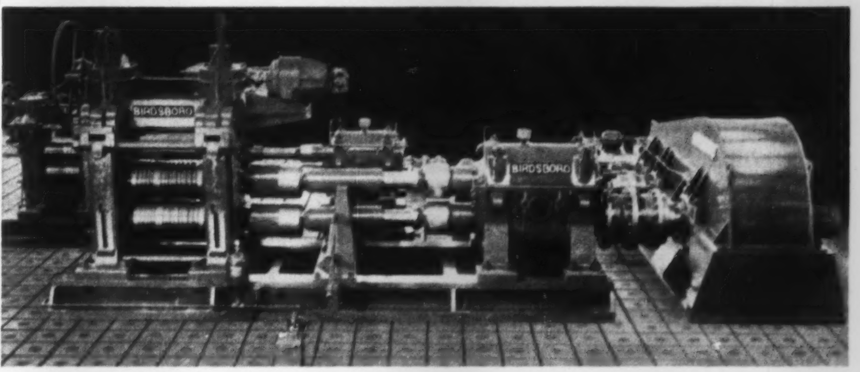
**12"—6 Stand Continuous Rod Mill and Drive**



**16"—10" Bar Mill**

DESIGNERS AND BUILDERS OF

STEEL MILL MACHINERY
HYDRAULIC PRESSES (Metalworking and Extrusion)
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel



BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

New York Office: Engineering Supervision Co., 120 West 42nd Street, New York 36, N.Y.

**ARDCOR**

## selects dependable, easy-to-maintain H&S speed reducers to drive giant mills.

Designed to roll form steel roof decks and flooring by American Roller Die Corp., this mill is 180 feet long and weighs 300 tons. It rolls up to 90 fpm and is fed by 12,000 lb. steel coils.

H & S speed reducers are key units in this Ardcor mill's main drive system. An eight speed H & S transmission equipped with Sykes Herringbone Gears and accurate shifting mechanism is coupled by high speed shafts to pinion stands. These H & S roll drives feature a combination of worm and helical gearing. The helical gears have a ratio of 1-1 with roll shafts.

Years of experience prove that *rugged construction* and *ample overload capacity* of H & S products assure trouble-free service and operating economy. If you have a power transmission problem, we'll be glad to help you. With our complete lines to choose from, you're assured of our unbiased recommendation. Contact your H & S representative, or write us today.

**THE HORSBURGH & SCOTT CO.**
**GEARS AND SPEED REDUCERS**
5112 Hamilton Avenue
Cleveland 14, Ohio

Send note on Company Letterhead for complete H & S Catalog

# NEW Literature

**Write directly to the company for a copy**

### Electric Motors

Bulletin GEC-1026A, 11 pages, gives buying information on a group of motors. General Electric Co., Schenectady 5, N. Y.

### Hand Trucks

Three trucks made of 1-in. tubular steel are presented in bulletin 453, 4 pages. Milwaukee Truck Co., 250 N. 12th St., Milwaukee 3, Wis.

### Crane Manual

This 75-page booklet gives rules on crane operation, describes safe loading equipment and practices. It includes safe load tables for slings, shackles, S-hooks and eyebolts. Safety Services Section, Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis.

### Red Lead

Recommendations for preparing steel surfaces for red lead paints are given in bulletin 11, 9 pages. Lead Industries Association, 60 E. 42nd St., New York 17, N. Y.

### Tooling

A 5-page folder describes chucks and holding fixtures that perform special jobs. Garrison Machine Works Inc., Dayton 4, O.

### Cutting Tools

Aluminum oxide turning and cutting tools are described in bulletin D-56, 12 pages. Metal Carbides Corp., Youngstown, O.

### Tubing

Bulletin 1, 3 pages, lists 121 metals and alloys used to make special and standard small diameter tubing. Bulletin 22, 3 pages, describes tubing for pressures up to 100,000 psi. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

### Taps

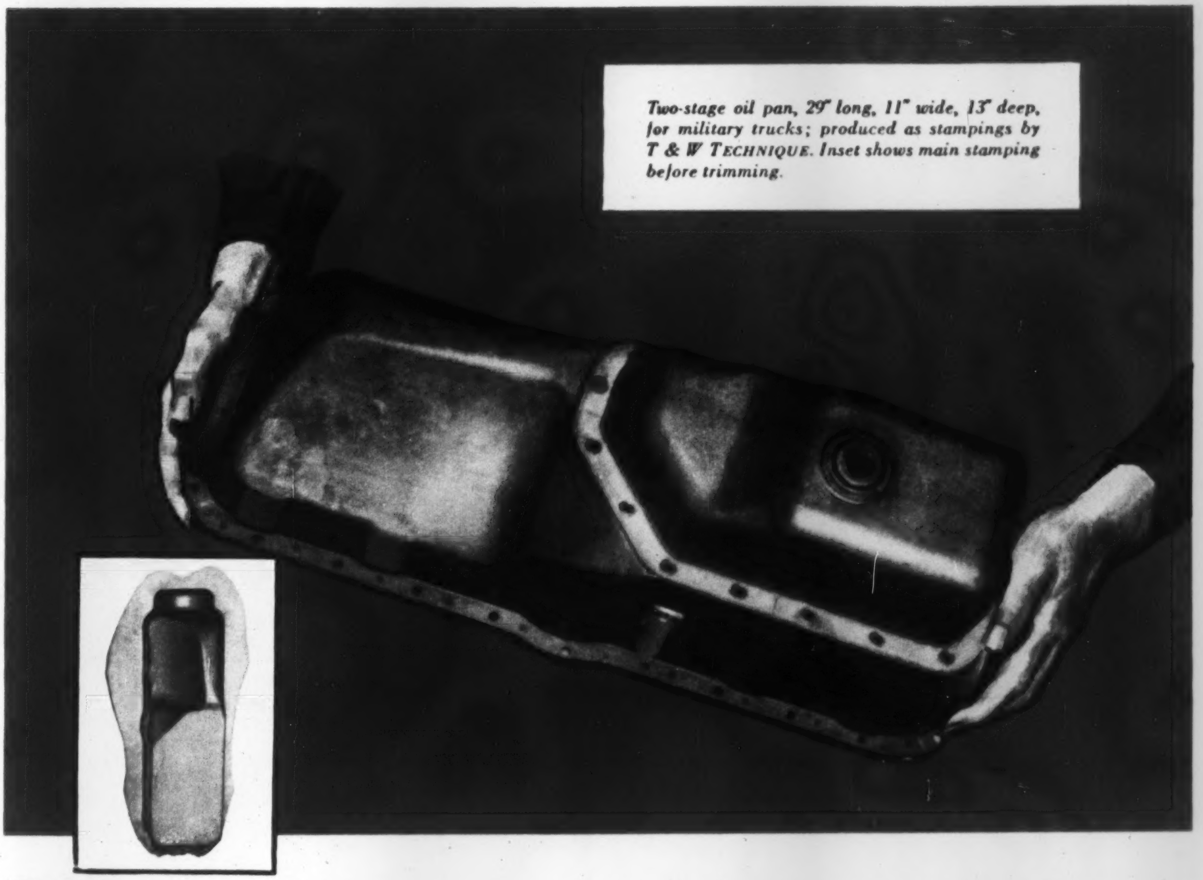
Basic information on taps and their uses is given in this 72-page booklet. Threadwell Tap & Die Co., Greenfield, Mass.

### Powdered Metal Presses

Bulletin 815, 24 pages, describes powdered metal presses with capacities of 1½ to 300 tons. F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

### Forgings

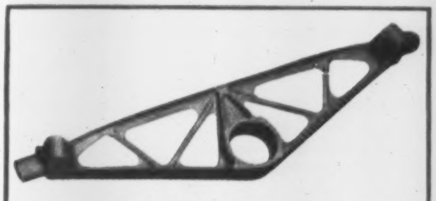
This 30-page catalog gives data on hammered forgings, composite die sections, cast-to-shape tool steels and



*Two-stage oil pan, 29" long, 11" wide, 13" deep, for military trucks; produced as stampings by T & W TECHNIQUE. Inset shows main stamping before trimming.*

# T&W TECHNIQUE can save production dollars for you

● If you buy stampings or forgings, then you want to know all about T & W Technique. Benefits from T & W Technique come to you in many ways — in effective design and engineering service, in extra skill which completes hard-to-produce parts without delay, in quality control, in delivery on schedule. But, always, forgings and stampings from T & W are likely to meet your needs so well that they cost you less at the point of assembly.



*T & W Technique provides you with forgings like this fulcrum, as well as stampings, which meet your needs better, help you save production dollars.*

**STAMPINGS T&W FORGINGS**

**TRANSUE & WILLIAMS**

*Over 50 years of experience*

*Sales Offices:*

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**TO: Transue and Williams, Alliance, Ohio**

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☐ Forgings ☐ Stampings

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Company ____________

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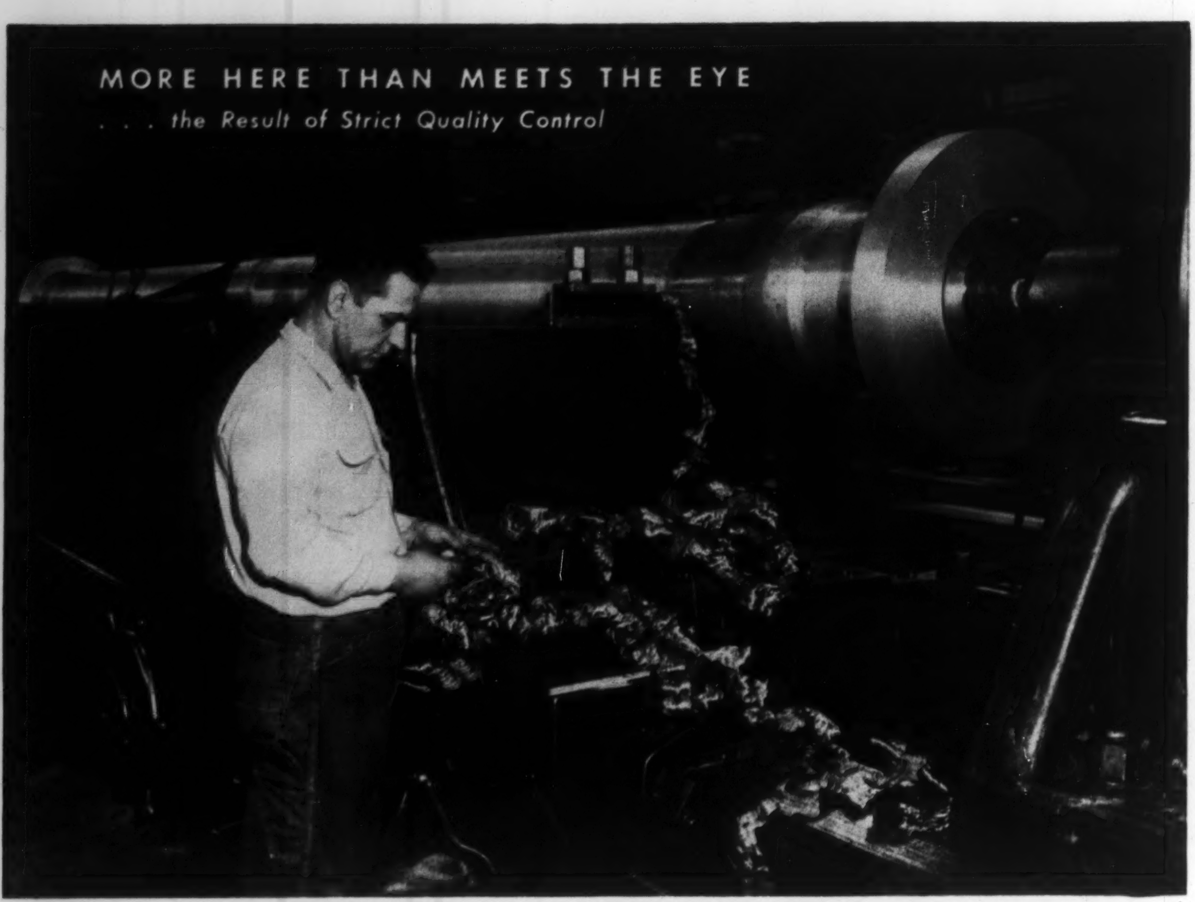
1303

**T & W DEEP DRAWN STAMPINGS AND FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY**


MORE HERE THAN MEETS THE EYE
. . . the Result of Strict Quality Control

**37 Feet of Unbroken Steel Chip Thin as a Cigarette Paper*

A 37 foot unbroken chip as thin as a cigarette paper, coming off the tool, dramatizes the quality of the steel in this large ship's shaft.

Behind this proof of quality steel is the ever expanding program at Erie Forge & Steel Corporation to develop improved techniques in steel-making . . . strict quality control at every step of the way from the composition of the steel to the finished product. Control of phosphorus and sulphur, maximum elimination of hydrogen, improved concepts in testing and evaluating quality are but a few of the areas under continuous research and development.

At Erie Forge & Steel, the belief that "excellent is not good enough" is sound assurance that you can place your steel forging and casting requirements here with full confidence. Your advantage is obvious . . . your steel forgings and castings are followed from start to finish under "One Responsibility and One Control".

•

**ERIE FORGE & STEEL CORPORATION**
ERIE, PENNSYLVANIA
MEMBER AMERICAN IRON AND STEEL INSTITUTE

ERIE
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information on forging and casting steel grades. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

### Welding Manual

Here's a 52-page reference manual for maintenance departments and job shops. All-State Welding Alloys Co. Inc., 249-55 Ferris Ave., White Plains, N. Y.

### Turret Lathes

This 8-page catalog presents a line of screw machine and turret lathe tools. Hamilton Mfg. Co. Inc., 286 Hamilton St., New Haven, Conn.

### Gas Appliances

This catalog covers a line of furnaces, burners, valves, torches, mixers, blowers, stock tank heaters and controls. Johnson Gas Appliance Co., Cedar Rapids, Iowa.

### Rust Prevention

Pentrol, a clear, air drying oil for use as a rust preventive and paint extender, is described in an 8-page bulletin. Flood Co., Hudson, O.

### Refractories

This 30-page bulletin describes the quality control steps in the manufacture of refractories. Harbison-Walker Refractories Co., Pittsburgh, Pa.

### Rail Crossing Guard

A flangeway guard that provides a smooth crossing is described in a 4-page bulletin. Rail & Track Division, Kasle Steel Corp., 4343 Wyoming, Detroit, Mich.

### Hot Spray Painting

Advantages of hot spray painting are listed in a 28-page booklet. Spee-Flo Co., 720 Polk, Houston 2, Tex.

### Ram Trucks

This 4-page folder describes a line of ram trucks with capacities of 20,000 to 80,000 lb. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

### Bar Steels

Bulletin 56, 4 pages, describes cold drawn bar steel that contains about 0.25 per cent lead to improve finish and production rates. Bliss & Laughlin Inc., Harvey, Ill.

### Cast Iron Inoculant

Here's a 16-page booklet that tells how SMZ alloy reduces chill depth, improves machinability, tensile strength and traverse properties.

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for 20 years without a major shutdown

Evinrude Motors, Milwaukee, Wisconsin, top manufacturer of outboard motors, has performed both carburizing and clean hardening in this furnace with consistently good results. In 20 years of service, the only major parts that needed replacement were the heating elements and this is an easy, inexpensive operation with Hevi-Duty Return Bend Elements.

The furnace was originally used to carburize crank shafts and connecting rods. Uniform case depths were easily obtained, because conditions within the retort can be duplicated. Positive pressure prevents contaminating gases from entering the retort. Forced convection and multiple zone control assure rapid and uniform heat penetration in the densest of loads. Cooling of parts in a sealed pit prevents decarburization and scaling.

Stainless steel propeller shafts are clean hardened at higher temperatures without changing the equipment. The same gas is used in the retort, but parts are quenched in oil rather than air cooled.

This furnace may also be used for nitriding, carbonitriding, and clean or bright annealing. Write for Bulletin 646 to see how this furnace can provide you with years of trouble-free, versatile service.

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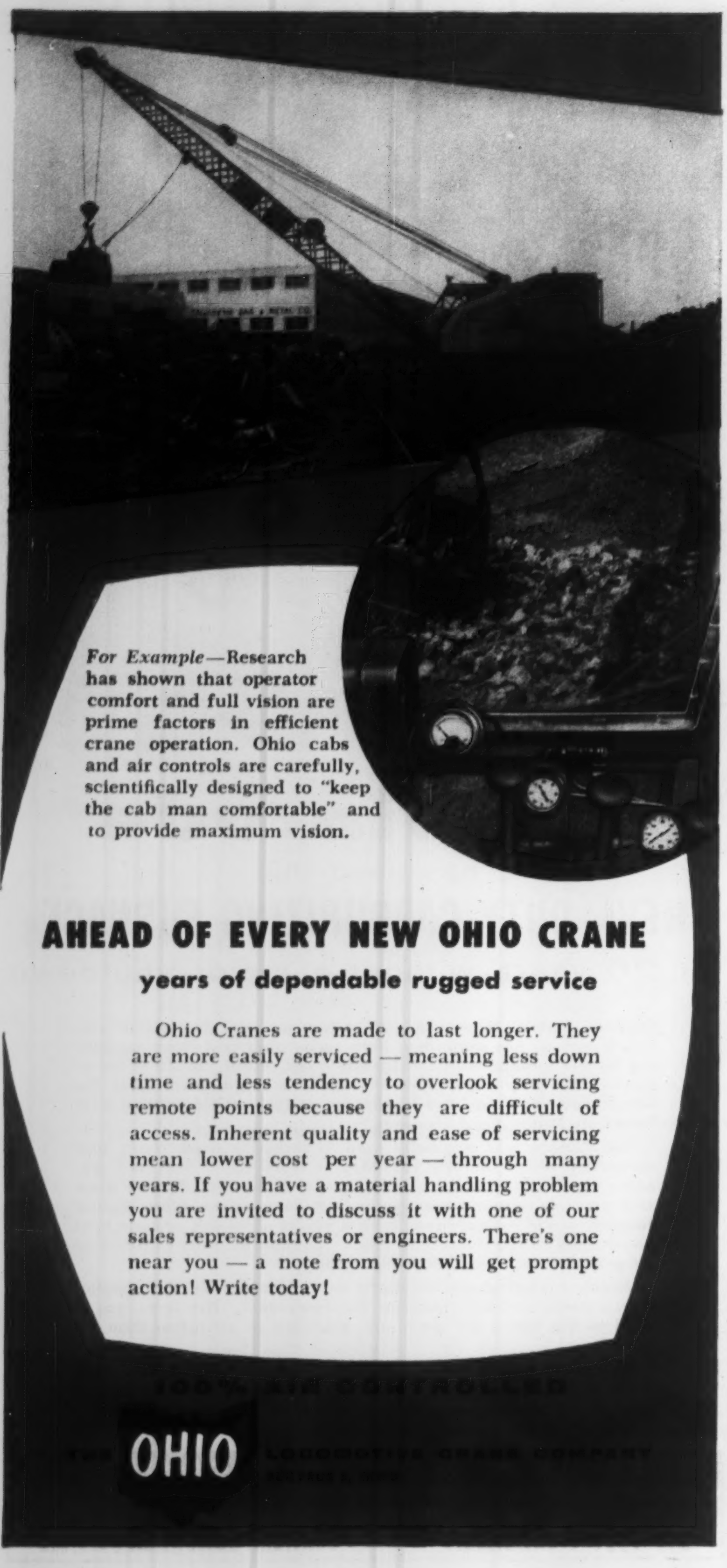
*Heat Treating Furnaces ... Electric Exclusively*

*Dry Type Transformers* *Constant Current Regulators*


*For Example*—Research has shown that operator comfort and full vision are prime factors in efficient crane operation. Ohio cabs and air controls are carefully, scientifically designed to "keep the cab man comfortable" and to provide maximum vision.

**AHEAD OF EVERY NEW OHIO CRANE**

**years of dependable rugged service**

Ohio Cranes are made to last longer. They are more easily serviced — meaning less down time and less tendency to overlook servicing remote points because they are difficult of access. Inherent quality and ease of servicing mean lower cost per year — through many years. If you have a material handling problem you are invited to discuss it with one of our sales representatives or engineers. There's one near you — a note from you will get prompt action! Write today!

100% AIR CONTROLLED

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## NEW LITERATURE

Electro Metallurgical Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

### Single Bearing Motor

Bulletin AM-4 describes a motor designed for the refrigeration and air conditioning industries. Marketing Department, Redmond Co. Inc., Owosso, Mich.

### Plastic Tubing

Physical and chemical properties of flexible tubing are listed in bulletin T-97, 28 pages. Plastics & Synthetics Division, U.S. Stoneware Co., Akron 9, O.

### Welded Chain

A high strength chain that resists bending, breaking and kinking is described in bulletin DH-319, 4 pages. American Chain Division, American Chain & Cable Co. Inc., York, Pa.

### Conveyor

A live rail wheel conveyor for fixed and portable installations is described in bulletin LR-56, 6 pages. Alvey-Ferguson Co., Cincinnati 9, O.

### Mechanical Packings

Bulletin 56, 24 pages, describes 246 types of industrial packings. Belmont Packing & Rubber Co., Butler & Sepviva St., Philadelphia, Pa.

### Pneumatic Controllers

High sensitivity, wide control-bands for temperature, pressure, flow and vacuum are presented in catalog 130, 56 pages. Bristol Co., Waterbury 20, Conn.

### Bearing Balls

An 8-page bulletin lists the uses of carbon steel bearing balls. Abbott Ball Co., Hartford, Conn.

### Butterfly Valves

This 40-page catalog, B-2, describes rubber seat valves and their characteristics. Henry Pratt Co., 2222 S. Halsted St., Chicago 8, Ill.

### Air Cylinders

Nonrotating air cylinders, valves and accessories are covered in bulletin 110, 12 pages. S-P Mfg. Corp., 30201 Aurora Rd., Solon, O.

### Automatic Lubrication

Distribution systems for automatic lubricators are depicted in bulletin 4A, 12 pages. Service, Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J.

### Press Unloader

Four unloaders used in stamping and forging press automation are de-

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## EXTRA LARGE SIZES

Modern developments in things of massive size—earth moving and road building machinery, hydraulic equipment and other unusually large assemblies—have increased the need for extra large Cap Screws.

Anticipating this demand, Cleveland will install the world's largest Boltmaker which will produce *in volume,* cap screws up to 1¼″ x 10″.

Every day we're shipping diameters up to 2½″, in lengths as required. Occasional special orders call for greater diameters, even up to 4 inches. Of course, size alone doesn't always provide required physical properties. Close attention to steel selection, testing and preparation, strict control throughout manufacturing processes, and final critical inspection assure you cap screws of *known strength* as well as brute size.

Physical properties of Cleveland Cap Screws in various styles up to 2½″ diameter are shown on our handy chart. Write or wire for delivery and price information on extra large Cap Screws.

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**2935 East 79th Street • Cleveland 4, Ohio • VUlcan 3-3700 TWX CV-42**
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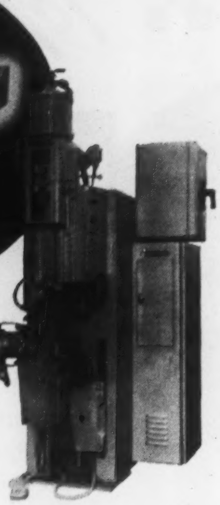
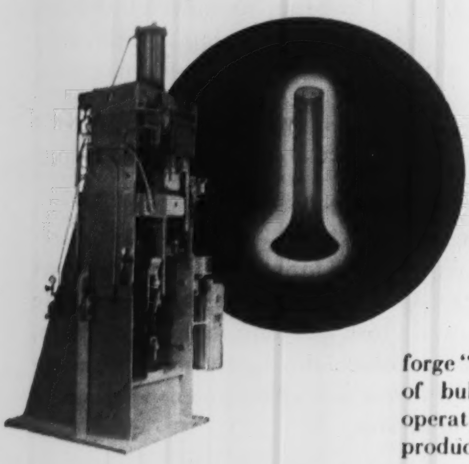
CONSIDER ELECTRO-FORGING



Resistance Hot Upsetting

Upsetting or riveting operations are performed quickly on standard resistance welders. High production and precise part locations of dissimilar metals are readily obtainable.



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Operations on ends of rods, also by resistance heating, are done in machines with forge "flow control." Shape and size of bulb ends permit machining operations on bulb for most efficient product manufacture.

High Production

Special machines can mechanize loading, unloading and perform machining operations in addition to electro-forging at minimum labor cost.

*Ask a T-W man about Electro-Forging.*

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ELECTRIC RESISTANCE AND ARC WELDING MACHINES

*Sales and Service*

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DAYTON • DENVER • DETROIT • LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON • SEATTLE • ST. LOUIS • STAMFORD
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scribed in a 4-page bulletin. Strokes are 12 to 48 in. Press Automation Systems Inc., 18616 Wyoming Ave., Detroit 21, Mich.

### Retaining Rings

Internal, external and open type rings are presented in a 12-page bulletin. Department P 44, Industrial Retaining Ring Co., 57 Cordier St., Irvington 11, N. J.

### Stacking Boxes and Bins

A line of steel storage and part handling equipment is covered in an 8-page bulletin. Randolph Industrial Equipment Co., 9559 W. Grand Ave., Franklin Park, Ill.

### Controls

The combining of several functions (such as recording, controlling and indicating) in a single unit is described in bulletin A-800, 4 pages. Swartwout Co., 18511 Euclid Ave., Cleveland 12, O.

### Safety Program

This summary of a safety program will be of interest to those preparing a similar booklet for their company. Public Relations Department, Norton Co., Worcester 6, Mass.

### Centrifugal Fans

Performance and construction of fans for heavy duty industrial uses are discussed in bulletin 4824, 8 pages. American Blower Corp., Detroit 32, Mich.

### Small Speed Reducers

Bulletin 98, 4 pages, describes reducers with a maximum power output of 0.1 hp. Metron Instrument Co., 432 Lincoln St., Denver 3, Colo.

### Hydraulic Parts

Catalog 156, 72 pages, presents a line of selector, restrictor, sequence, check, shutoff, brake control and parking valves. Also covered are special components for aircraft and general industrial uses—actuators, accumulators, special valves and steering controls. Aircraft Products Co., 300 Church Rd., Bridgeport, Pa.

### Analytic Instruments

This 8-page bulletin describes instruments that separate and analyze any gaseous or vaporizable liquid mixture. Podbielniak Inc., 341 E. Ohio St., Chicago 11, Ill.

### Descaling Stainless

A process for descaling stainless, alloy steel and titanium is described in a 4-page bulletin. Kolene Corp., 12890 Westwood Ave., Detroit 23, Mich.

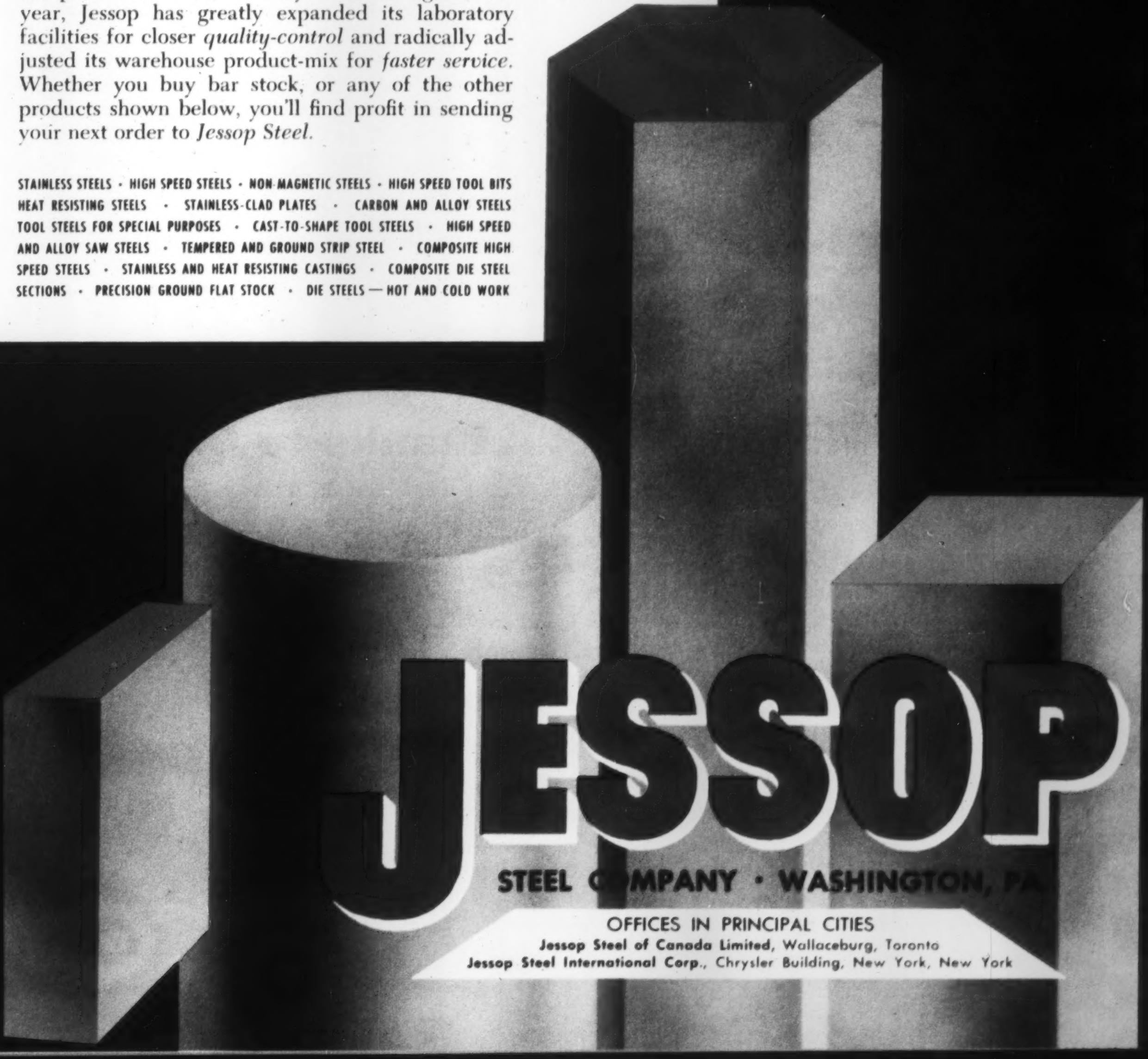
# JESSOP STEEL*

## HIGH QUALITY*

## GOOD SERVICE*

* *High quality* and *good service* are apt words to describe what you get when you buy tool and high-speed bar stock from *Jessop Steel.* Descriptive in the past—even more so today! For, during the last year, Jessop has greatly expanded its laboratory facilities for closer *quality-control* and radically adjusted its warehouse product-mix for *faster service.* Whether you buy bar stock, or any of the other products shown below, you'll find profit in sending your next order to *Jessop Steel.*

STAINLESS STEELS · HIGH SPEED STEELS · NON-MAGNETIC STEELS · HIGH SPEED TOOL BITS · HEAT RESISTING STEELS · STAINLESS-CLAD PLATES · CARBON AND ALLOY STEELS · TOOL STEELS FOR SPECIAL PURPOSES · CAST-TO-SHAPE TOOL STEELS · HIGH SPEED AND ALLOY SAW STEELS · TEMPERED AND GROUND STRIP STEEL · COMPOSITE HIGH SPEED STEELS · STAINLESS AND HEAT RESISTING CASTINGS · COMPOSITE DIE STEEL SECTIONS · PRECISION GROUND FLAT STOCK · DIE STEELS — HOT AND COLD WORK



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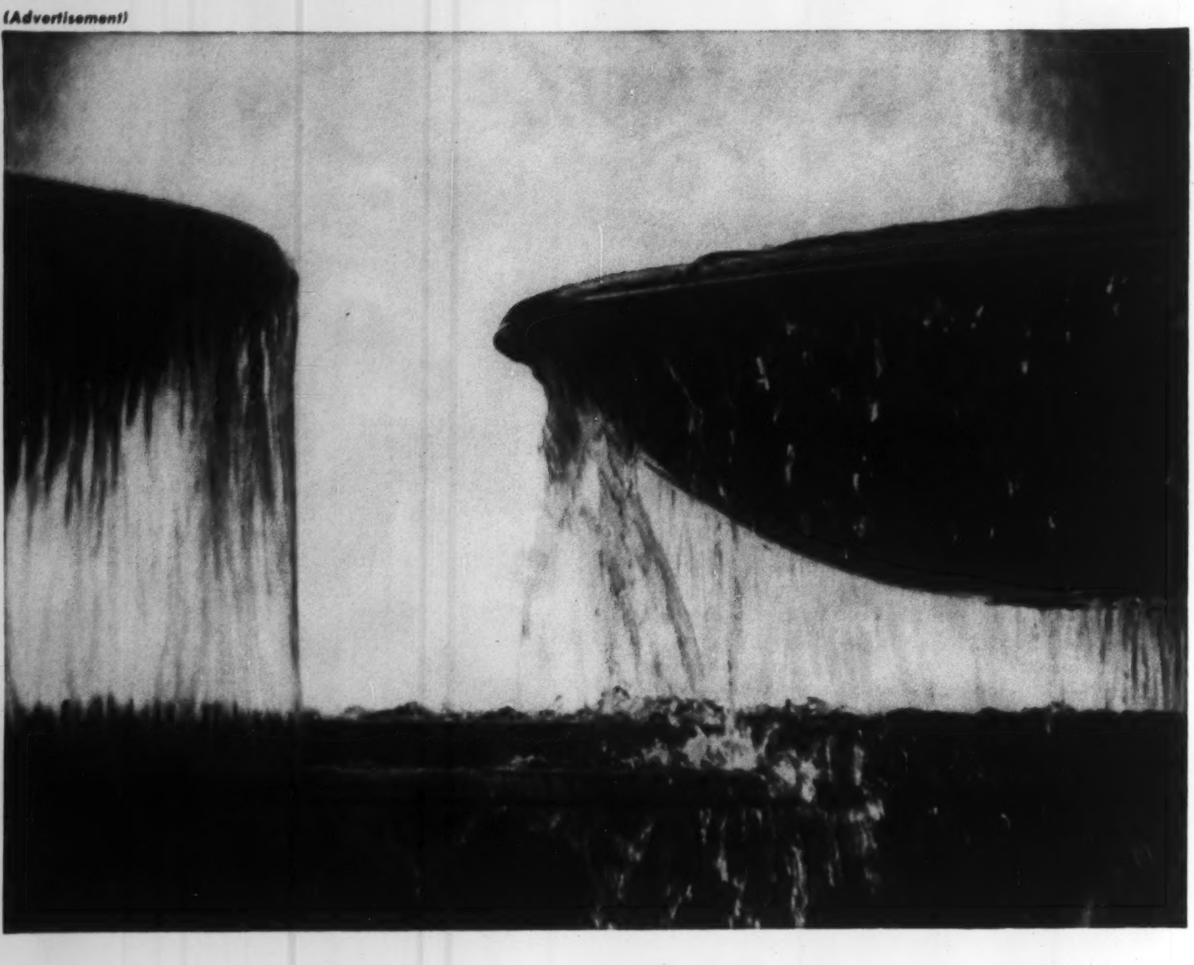
**Jessop Steel International Corp.,** Chrysler Building, New York, New York

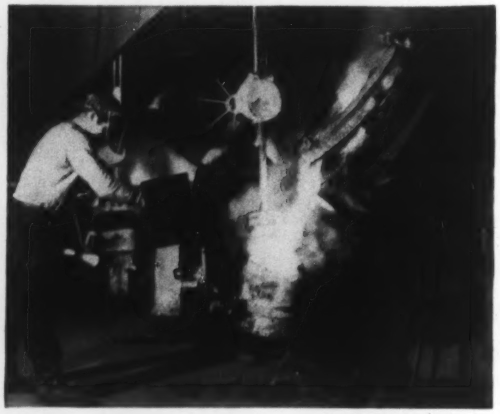


# Beautiful bronze fountain for Pittsburgh's new Mellon Park . . . thanks to GAS

Precise heat control on Gas-fired melting furnaces helped cast nine huge bronze bowls for the unusual fountain display in Mellon Park, Pittsburgh, Pennsylvania.

To make the castings, Jas. H. Matthews & Company of Pittsburgh melted bronze ingots in large Gas-fired furnaces. Accurate furnace temperature control provided by Gas burners held the molten metal at 2300 degrees F. until the metal was ready to be poured into specially prepared sand molds.

Accurate, controllable Gas is an excellent production tool throughout all industry. For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss with you the economies and outstanding results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*



**STEEL**

*November 5, 1956*

# Market Outlook

PRESSURE is building up for increases in steel prices.

You can see that in statements of steel company executives.

Eugene G. Grace, chairman, Bethlehem Steel Co., Bethlehem, Pa., says rising costs have virtually absorbed the average price increase of $8.50 a ton which was put into effect in August. To meet the continued uptrend in costs of services and materials, still higher steel prices will be needed, he declares. Bethlehem is studying the problem carefully.

**CONCURRENCE—**Looking back at the August price increase, Joseph L. Block, president, Inland Steel Co., Chicago, says: "It is our belief that it will prove inadequate to cover our added costs." One of Inland's vice presidents, John F. Smith Jr., told St. Louis purchasing agents that steel prices are still too low and that another price increase is needed.

**"MATTER OF TIME"—**John L. Neudoerfer, president, Wheeling Steel Corp., Wheeling, W. Va., comments that the new coal wage pact, increased freight rates and many other increases may appear minor, but they total up to a tidy sum. "It is only a matter of time before you will see more price increases," he says.

R. S. Lynch, president, Atlantic Steel Co., Atlanta, said not long ago: "It looks like steel prices will have to go up $3 to $4 a ton about the first of the year." The August increase in steel prices lacks about 30 per cent of meeting increased wage costs alone, he declared.

**CONTRAST—** U.S. Steel Corp., largest steel producer and pace setter in steel pricing, discounts the possibility of a general price increase now. The corporation, however, constantly reviews individual products in the light of all conditions.

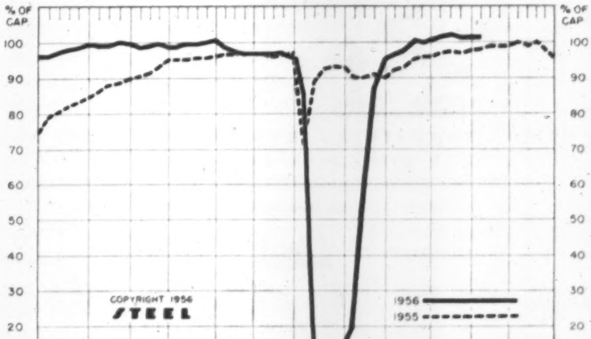
A spur to higher prices may lie in an escalator clause in the steel labor contracts. Steelworkers are to receive cost-of-living increases on Jan. 1 if the government's consumer price index on Nov. 15 is above 116.5 per cent of the 1947-1949 average. In September, the index reached a record 117.1.

**WATCH THIS—**One product likely to rise in price is nickel-bearing stainless steel. Nickel is in such strong demand that steelmakers are bidding high for nickel-bearing stainless steel scrap as a source of nickel. This scrap, up 45 per cent in price since the first of this year, is costing steelmakers around $500 a gross ton (see page 185).

**SCRAP RISES—**Other scrap is trending upward, too. In the week ended Oct. 31, STEEL's price composite on steelmaking grades rose for the second consecutive week. A $1.67 rise put the composite at $58.67 a gross ton. The buoyancy stems from prospects of continued high production in the steel industry and a strong demand for export scrap. Scrap is being exported at a record pace. Japan is the big taker.

**TIN MILL PRICES UP—**Tin mill product prices went up 10 cents a base box on Nov. 1. This increase of a little more than 1 per cent applies to prices for the next six months. STEEL's price composite on finished steel remained unchanged at $137.48 a net ton because it covered the week ended Oct. 31 and did not reflect the tin mill price increases.

## NATIONAL STEELWORKS OPERATIONS



## DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

| | Week Ended Nov. 4 | Change | Same Week 1955 | Same Week 1954 |
|---|---|---|---|---|
| Pittsburgh | 100.5 | 0* | 102 | 73.5 |
| Chicago | 102 | — 0.5* | 99 | 79 |
| Mid-Atlantic | 102 | + 1 | 97.5 | 70 |
| Youngstown | 102 | 0 | 97 | 74 |
| Wheeling | 101.5 | 0 | 98.5 | 81 |
| Cleveland | 104 | — 3.5* | 101.5 | 87 |
| Buffalo | 107.5 | 0 | 105 | 90 |
| Birmingham | 95.5 | 0 | 94 | 64 |
| New England | 87 | + 2 | 91 | 59 |
| Cincinnati | 85.5 | —15 | 90 | 76.5 |
| St. Louis | 105 | + 10.5 | 106 | 91 |
| Detroit | 99.5 | — 0.5 | 97 | 80 |
| Western | 109 | + 4 | 98 | 86 |
| National Rate | 101.5 | 0 | 98 | 75.5 |

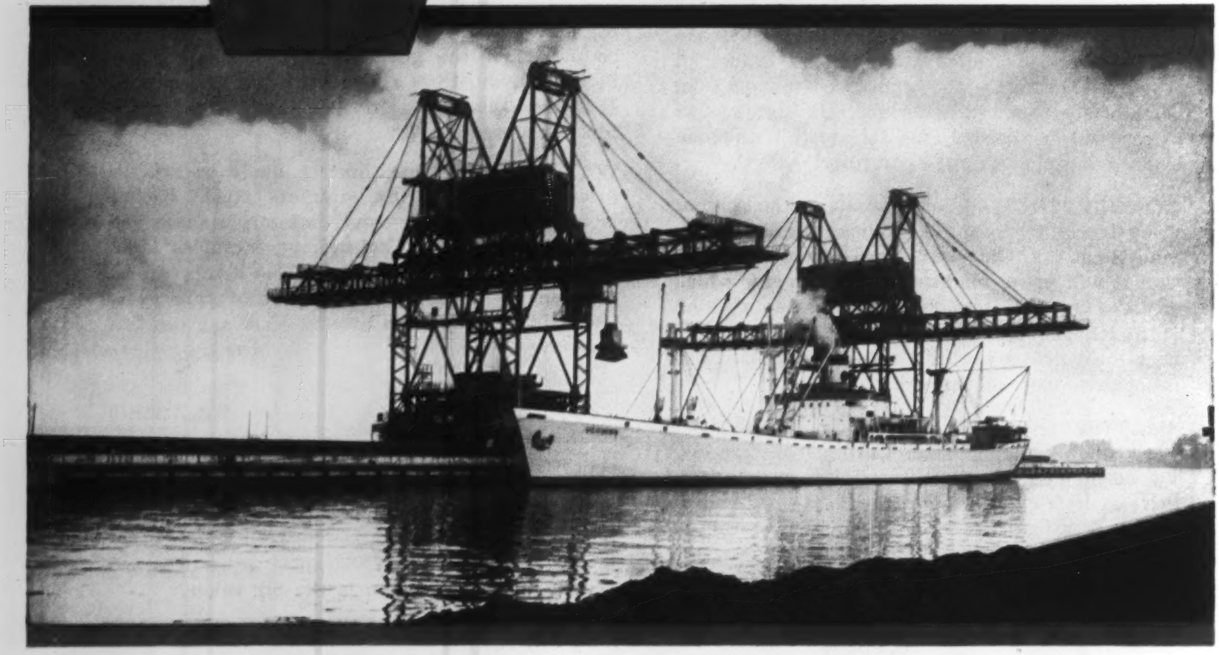
## INGOT PRODUCTION‡

| | Week Ended Nov. 4 | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| INDEX (1947-1949=100) | 154.8† | 155.1 | 156.0 | 149.4 |
| NET TONS (In thousands) | 2,486† | 2,491 | 2,506 | 2,400 |

---

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

# new Pennsylvania RR pier handles up to 3600 tons per hour with BROWNHOIST ore unloaders



60 tons a minute! Seems incredible, but that's the production pace set by these two giant Industrial Brownhoist ore unloaders at the new Pennsylvania Railroad pier in Philadelphia, Pennsylvania. Towering over both pier and ocean-going ore vessels, the two enormous Brownhoist machines—each with a free-digging capacity of 1800 tons per hour—provide this ore terminal with the most modern and efficient unloading facilities in the United States. They can travel the full length of the pier and lower apron extensions from either side to obtain a reach of 72 feet from the dock. Each huge 25 ton capacity bucket rolls out, takes a bite, rolls back on the apron to drop its contents into a 100-ton receiving hopper, then rolls out for another bite. Time elapsed from bite to bite? *Just 45 seconds!*

The same engineering experience that made these Brownhoist ore bridges possible has also resulted in other fine Brownhoist materials handling equipment . . . locomotive cranes, wrecking cranes, car dumpers, traveling bridge cranes, buckets. If you have a heavy duty materials handling problem, it will pay you to discuss it with our engineers at Brownhoist.

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

**INDUSTRIAL BROWNHOIST CORPORATION**
**BAY CITY, MICHIGAN** • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal
AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Penn-Texas

184

# BROWNHOIST

## Pinch on Plate and Structurals

(Per cent of respondents)

Arrows show trend since STEEL's last report.

| | Less than 10 days | | 10-30 days | | 30-60 days | | 60-90 days | | 3-6 months |
|---|---|---|---|---|---|---|---|---|---|
| Hot-rolled carbon bars | 7 | ← | 18 | — | 44 | — | 30 | — | 1 |
| Cold-finished bars | 5 | → | 12 | ← | 48 | — | 22 | — | 13 |
| Hot & cold-rolled sheets, strip | 15 | ← | 6 | — | 31 | — | 42 | — | 6 |
| Plates, light | 9 | ← | 46 | — | 30 | — | 9 | — | 6 |
| Plates, heavy | 20 | → | 47 | ← | 20 | — | 10 | — | 3 |
| Structural shapes | 27 | ← | 35 | — | 23 | — | 11 | — | 4 |

Legend: Inventories of the average metal user are in the white blocks.

# Demand Pulls Stocks Down

**More buyers are living on hand to mouth supplies of plates and structurals. Capacity operations by the steel industry won't give much relief through the second quarter**

DEMAND for some steel products promises to keep purchasing agents hopping well into the second quarter of 1957. Since STEEL's last quarterly survey of stocks (STEEL, Aug. 6, p. 153), average inventories held by consumers have been moving downward (see table).

Stocks of light plate and hot and cold-rolled sheet and strip have been particularly affected. Three months ago, the average user came out of the strike with a 20 to 50 day supply of light plate; today, he's in the 10 to 30 day category along with heavy plate and structural users. Last quarter, sheet and strip buyers had stocks for 50 to 90 days of operations; now they are in the 30 to 60 day class.

**Reasons** — Steel stocks have dropped for two reasons: 1. Demand for plates and structurals and some other hard to get items. 2. An easing of demand in other areas like cold-rolled sheet and carbon bars. With the threat of a strike in 1957 removed by steel's three-year contract, there appears little chance of an inventory boom. Some building may come in anticipation of higher prices, but tight money will restrict that tendency.

Undoubtedly, consumer reaction to the 1957 autos will affect the steel picture more than any other factor next year.

**Unreliable**—A California buyer evaluates the plate situation this way: "Mill commitments for delivery of plates are not definite or reliable. This makes planning for adequate inventories difficult."

Sheet and strip may improve, says a Youngstown firm: "Three months from now we expect to have sheet and strip inventories in balance at about a 45 day supply." But structurals are tough: "We are maintaining our inventory position by buying anything offered by the warehouses at regular prices," says a Detroiter.

"Our mill allotments of plate have been reduced, and there's no relief in sight," moans an upstate New York purchasing agent. "What's the use? There just aren't any structurals to be had," comments a heavy structural user from Missouri.

**Inadequate**—Close to 30 per cent of the respondents to STEEL's questionnaire find deliveries generally inadequate today. About 25 per cent are experiencing no troubles at all. The rest are feeling spot shortages.

One of four respondents says plates and structurals give the most trouble on delivery. In the last three months, the same number have seen their supplies of those items drop.

Outlook for the next quarter: Little improvement in hard to find items. About 80 per cent see supplies in the same balance. The other 20 per cent are almost evenly divided on whether supplies will will be better or worse than they are. Buyers tend to feel plates will ease up before structurals do.

**Sheet and Bars**—Hot-rolled carbon bars and cold-finished bars are fairly steady in the 30 to 60 day class. More movement showed up in hot-rolled sheets than in cold rolled. Users of hot rolled who lowered inventories last quarter outnumbered those who built them up 2 to 1. The reverse was true for cold-rolled users.

Seamless tubing continues to be in short supply. There was noticeable movement into the 30 to 60 day category from somewhat higher supplies following the end of the strike. Stocks of welded tubing also dropped.

**Hindsight**—Inventories of many steel products during the strike ran higher than generally thought. This latest survey by STEEL points up a lot of movement out of the three to six month category. For example, three months ago, 20 per cent of hot-rolled carbon bar users held 90 day-or-over stocks. Now, almost all of those respondents are in the 60 to 90 day class.

Cold-finished bar users followed the same pattern, although less drastically. Manufacturers' wire supplies dropped into the 30 to 60 day class after being at 60 to 90 days at the end of the strike.

No problems in aluminum and copper supplies are apparent. Copper products held steady, while some building went on in aluminum.

## Steel Bars . . .

**Bar Prices, Page 187**

Stronger demand for hot-rolled carbon bars is developing. Spottiness noted occasionally over recent weeks has disappeared, and most producers anticipate a brisk market throughout the first quarter. Makers are beginning to take some orders for that period.

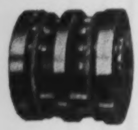
Swelling automotive requirements are the most encouraging feature. This uptrend is noted in both carbon and cold drawn, though there is still much room for improvement in cold drawn.

Hot bars offered in New England are being taken up by users, and more heavy flats could be sold if they were available, despite a lag in demand for hot rolled on the part of converters.

Cold-finished bars can be booked for December shipment. The same is true of alloy bars, unless they are heat treated, ground or further processed. Alloy demand, including stainless, is up slightly for aircraft, power equipment and autos.

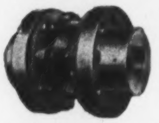
Coupling problem?
THOMAS will help select your coupling

FLOATING SHAFT
BMR—for heavy duty service where excessive misalignment is expected



DOUBLE FLEXING
DBZ—for high speed, heavy duty drives

SINGLE FLEXING
SS—for engine-driven generator sets, especially with outboard bearing



DOUBLE FLEXING
AMR—for engine and medium speed drives

Your Thomas Sales Engineer, backed by 40 years of coupling experience, will help you select the correct type Flexible Coupling from the Thomas catalog. Or, he will engineer special variations for unusual cases. For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last *forever*.

NO LUBRICATION • NO MAINTENANCE • THERE ARE NO WEARING PARTS

Under load and misalignment, only Thomas Flexible Couplings offer *all* these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Visual inspection while operating
4. Smooth, continuous drive with constant rotational velocity
5. Original balance for life

*Write for Engineering Catalog 51A and the name of the Thomas Flexible Coupling engineer nearest you*

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

## Sheets, Strip . . .

**Sheet & Strip Prices, Pages 188 & 189**

Sheetmakers could have handled more orders for cold rolled this quarter had they developed earlier. Consumer delay in covering needs, particularly automobile builders, resulted in the mills accepting a larger volume of hot-rolled sheet orders. The result: The business of some mills with a diversified line of products is heavier in hot rolled and other items than it is in cold-rolled sheets.

Some producers are encountering difficulty in rolling all the cold rolled they finally booked for shipment this quarter. Indications are there will be a carry-over of at least three weeks at the end of the period. In this connection, hot-rolled sheets are in tight supply and the carry-over will be greater. Reflecting this, an inquiry for conversion of hot rolled in the Midwest failed to get a commitment.

No late quarter pressure for coated sheets and specialties is indicated. Corrugated sheet sales are off in the Southwest, as well as in Kansas, Missouri and Oklahoma because of the drouth. Normally, business is good in those areas at this time of year.

Various makers still have open spaces in schedules on enameling stock and low silicon sheets, reflecting a lag in household appliance specifications. Demand for steel from appliance manufacturers in the Midwest is mixed. Some are taking full quotas; others are releasing tonnage.

In New England, sheet and strip orders for first quarter are coming in slowly, notably for delivery beyond January. Volume for the period, however, is expected to better that in the current quarter, with more inventory buying and heavier production requirements, notably automotive, indicated.

The longer term outlook in sheets is noticeably better than immediate demand prospects. Auto builders continue to specify cautiously, pending public acceptance of the 1957 model cars. Some builders are reported selling cold-rolled sheets purchased for 1956 model production. Such steel would not be sold were supplies tight. Ordinarily, holdover sizes are resheared, with losses sometimes

PRICE is a RESULT not a point of DEPARTURE

Anthony J. Lucas

METHODS MGR., THE CINCINNATI GEAR CO.

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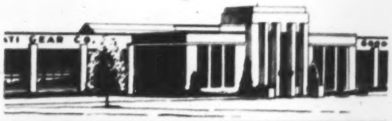

running up to 25 per cent. Despite the current uncertainty in the automotive industry, it generally is believed great momentum is being built up for the first half of next year on auto acount.

The Quartermaster's Purchasing Agency, Columbus, O., general depot, has taken estimates on 275,000 steel drums of 55-gallon capacity.

## Tubular Goods . . .

Tubular Goods Prices, Page 191

Oil country goods makers are confident of full first quarter production schedules. It's difficult to find any open space in order books, and they were opened for the period only a few weeks ago.

Specialty tubing sales are strong, but there is an area of slowness in the sale of pipe for plumbing and heating.

Buttweld pipe is moving briskly in some areas, St. Louis for example. In that market, deliveries extend into December. Some buttweld sizes are sold out for the rest of the year. Books for conduit are closed for this quarter at Laclede Steel Co., a condition that's pretty much the rule throughout the industry. Strong demand is expected this winter.

## Plates . . .

Plate Prices, Page 187

A Chicago district mill doing conversion rolling of plates and shapes reports its capacity for this work is completely sold out through the first quarter.

Conversion adds about 4 cents a pound to consumers' costs but only 2 to 3 per cent to national output. Imported material usually adds 3.5 to 5 cents a pound over domestic prices and perhaps 3 to 5 per cent to the national total.

Most platemakers have opened first quarter order books for nonrated and rated tonnage. Rated appears to run around 10 per cent of productive capacity, against 8 per cent this quarter.

Producers estimate arrearages will average three to four weeks on Jan. 1.

Demand pressure for plates continues strong from all sides. Fabricators of tanks, pipe and heavy structural work can't get nearly

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enough tonnage. Freight car builders, heavy industrial equipment manufacturers and shipbuilders are having similar troubles.

Ship needs are expected to accelerate rapidly over the coming months. The proposed program for building 50 tankers, under discussion in Washington, will require 750,000 tons of plates alone.

Tank shops in New England are operating on low inventories. Tonnage of light plates coming to them from the sheet mills is disappointing.

## Tin Plate . . .

Tin Plate Prices, Page 189

U.S. Steel Export Co., New York, increased price bases on tin mill products effective Nov. 1: Common coke, $10.50 per base box; 0.25 lb coating electrolytic tin plate, $9.18; special coated manufacturing terne, $9.97; black plate, superdraw, $8.30.

These prices reflect changes in the domestic quotations which went into effect on the same date, representing an increase of 10 cents.

Tin plate prices advanced 10 cents per base box, effective Nov. 1. The upward revision was first announced by U.S. Steel Corp. about a month ago. Other producers have followed the lead.

## Wire . . .

Wire Prices, Pages 189 & 190

Upholstery wire is moving well in the St. Louis area, with most mill order books filled through December. The bulk of Laclede Steel's output goes for items like bed springs and mattresses. Some tonnage goes directly to the automotive industry.

Deliveries of manufacturers wire in the Cleveland area are reported running about four weeks. Shipments of some wire items extend to 12 weeks. Merchant wire deliveries can be had in three weeks generally, though a few items are reported extended up to eight weeks.

## Warehouse . . .

Warehouse Prices, Page 192

Distributors are taking their full quotas of steel products from the mills, although demand has declined in some districts, following an accumlation of ample stocks by the smaller manufacturers. Users of structural shapes, plates and large hot-rolled bars are taking all the tonnage available.

Supplies of sheet, cold-finished bars, wire and most tubular products are good.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 187

Reinforcing bars are in heavy demand, and most mills have sufficient business on their books to keep them engaged at capacity for months ahead.

Supply is reported in somewhat better balance in New England. Distributors' inventories are larger, and mill deliveries are reported to be slightly improved. This will be a peak year in volume in the New England area. Heavy bridge tonnage is supplemented by increased needs for building bars as a result of the switch from steel to reinforced concrete construction.

When cold weather sets in, demand pressure will ease somewhat. Reinforcing bar makers are having

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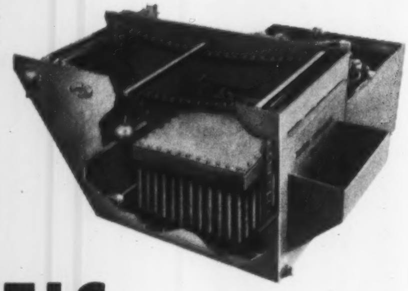

more success in closing the gap between supply and demand than are the structural steel producers.

Road projects and power dam construction are calling for large tonnages of reinforcing steel in the Pacific Northwest.

## Pig Iron . . .

Pig Iron Prices, Page 192

There's going to be a scramble for pig iron in the East now that Bethlehem Steel Co. has announced its permanent withdrawal from the merchant iron market. Some of Bethlehem's customers are confident they can make adjustments without too much trouble and extra cost, but some larger consumers are more concerned.

Bethlehem will continue to sell merchant iron until Jan. 1, after which time it will use all of its production in an effort to step up its own steel output. The company is the only eastern producer of low phos pig iron. Complicating the situation is the fact that Alan Wood Steel Co. will take out one of its two furnaces at Swedeland, Pa., for enlargement and rehabilitation. It will be out for about five months. Phoenix Iron & Steel Co. at Chester, Pa., and Colorado Fuel & Iron Corp. at Birdsboro, Pa., the district's other two producers, are not expected to be of much help. They are supplying affiliates and long-term contractual buyers.

How much more pig iron can be supplied by Hanna Furnace Corp. and Republic Steel Corp. remains to be seen. Republic's Troy, N. Y., furnace will probably be looked to principally to supply low phos for the eastern merchant trade. Imported iron is not expected to be of much help. There hasn't been too much of this in the area for a long time, and what has been offered has been at high premiums for dependable grades. Some relief may be afforded by southern furnaces as well as inland furnaces in the North. But freight rates from these suppliers would not be too attractive.

Bethlehem officials feel they can serve their trade better by turning out every bit of steel possible. One official says that merchant pig iron supply is still on the easy side and that the company is confident their customers will not have difficulty getting iron elsewhere.

Merchant iron consumers are buying in a steady, normal manner. They are covering their near term needs but showing little tendency to stockpile. Foundries supplying the automotive industry report a slight pickup in operations.

Steel mills are endeavoring to stockpile iron against the time when they may have to curtail blast furnace output temporarily for relining work.

## Iron Ore . . .

Iron Ore Prices, Page 194

Shipments of Lake Superior iron ore in the week ended Oct. 29 totaled 2,571,108 gross tons, reports the Lake Superior Iron Ore Association. The average daily loading was 367,301 tons. In the like week a year ago, shipments amounted to 2,874,460 tons, and the average daily loading was 410,637 tons.

Total movement of ore to Oct. 29 was 66,113,292 gross tons. This is 12,846,237 tons below a year ago.

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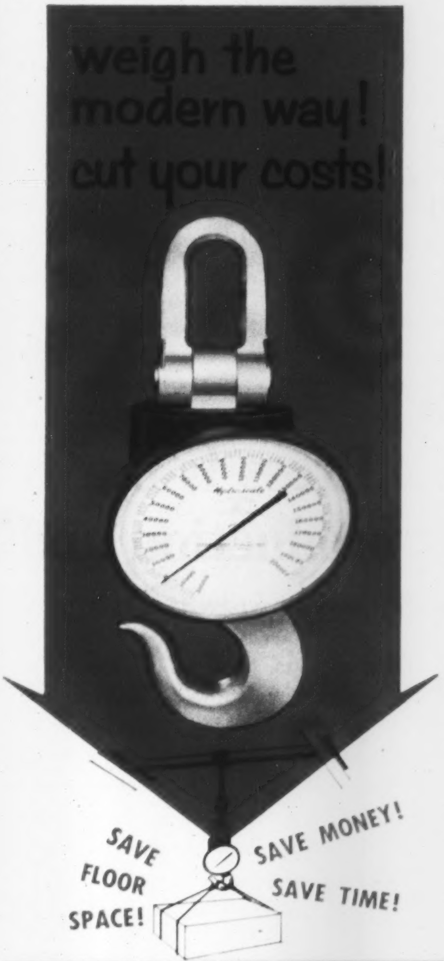

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## Structural Shapes . . .

**Structural Shape Prices, Page 187**

Fabricating shops are having difficulty obtaining steel from the mills in sufficient volume to keep their deliveries on schedule. The structural shortage is behind numerous reports of delayed construction. All types of construction are affected—industrial, institutional, public.

Timetables on many large projects will be revised because steel is not coming through from the fabricators on time. One leading eastern interest estimates that fabricators could cut delivery time in half if sufficient plain material were available.

Eastern shape supply reflects close to peak operation at Bethlehem Steel Co.'s recently enlarged Saucon Works, now rated at a monthly capacity of 210,000 tons. October output amounted to 200,000 tons.

New England fabricators are having a time meeting commitments because of the steel shortage. They are oversold and are estimating less new work. Demand in the area continues heavy despite design changes to prestressed and reinforced concrete. New contracts in the area include 8000 tons for the Greater Hartford (Conn.) Bridge Authority. A bridge span at Windsor, Conn., will go prestressed concrete.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

5750 tons, 28-story office building, Corning Glass Works, southeast corner, Fifth Ave. and 56th St., New York, through George A. Fuller Co., to Bethlehem Steel Co., Bethlehem, Pa.

4000 tons, superstructure, Founders bridge, Connecticut river, Hartford-East Hartford, Conn., to Phoenix Bridge Co., Phoenixville, Pa., through the Greater Hartford Bridge Authority.

1957 tons, 296 transmission towers, Long Island Lighting Co., Holbrook, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

960 tons, highway bridge, Rensselaer county, New York, through Lane Construction Co., to Central Iron Works, Buffalo.

640 tons, state bridge work, Monroe county, New York, through Lane Construction Co., to Ernst Iron Works, Buffalo.

315 tons, three bridges and approaches, Waterbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Palmer Tarinelli Construction Co., Bridgeport, Conn., general contractor.

310 tons, three bridges and approaches, Torrington, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Oneglia & Gervasini Inc., Torrington, general contractor.

300 tons, warehouse, Alaska Junk Co., Portland, Oreg., to unstated Portland fabricator.

300 tons, boiler supports for Montana-Dakota Utilities, Williston, N. Dak., through Combustion Engineering Co. to the Flint Steel Corp., Tulsa, Okla.

275 tons, repairs, Longfellow bridge, Cambridge, Mass., to Groisser & Shlager Iron Works, Somerville, Mass., through J. F. White Construction Co., Cambridge, general contractor.

210 tons, manufacturing and office building, Ford Motor Co., Green Island, near Albany, N. Y., through Irwin & Leighton, Philadelphia, general contractor, to Kinney Iron Works, Albany, N.Y.

185 tons, state bridge work, Lackawanna county, Pennsylvania, to American Bridge Division, U.S. Steel Corp., Pittsburgh, through Joseph Futch Construction Co., Exeter, Pa., general contractor.

180 tons, state bridge works, Berks county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, two rolled beam bridges, Bristol, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Charter Oak Construction Co., Hartford, Conn., general contractor.

165 tons, elementary schools, Wayland, Mass., to West End Iron Works, Cambridge, Mass.; White Construction Co., Boston, general contractor; 80 tons, reinforcing, Northern Steel Inc., Medford, Mass.

165 tons, five state highway bridges, Spaulding turnpike, Rochester, N. H., to West End Iron Works, Cambridge, Mass.; Frank Palazzi & Sons Inc., Johnston, R. I., general contractor.

145 tons, state highway bridge, Piscataquis river, Abbot, Me., to Bancroft & Martin Rolling Mill Co., South Portland, Me.; Frank Rossi, Gardiner, Me., general contractor; 35 tons of reinforcing to the same fabricator.

120 tons, addition, distributing house, Western Electric Co., Houston, to Capitol Steel & Iron Co., Houston.

### STRUCTURAL STEEL PENDING

3570 tons, New York state bridge, FINTC-56-1, no bids submitted. Appropriation probably will be revised and new bids requested.

1460 tons, state bridge, FIC-56-11, Onandaga county, New York, S. J. Groves & Sons, Syracuse, N. Y., low on general contract.

1300 tons, Matteawan State Hospital, Beacon, N. Y.; Mt. Vernon Contracting Co., Mt. Vernon, N. Y., low on general contract.

940 tons, state bridge, FINTC-56-2, Erie county, New York, H. F. Stimm, Buffalo, low on general contract.

620 tons, state bridge, MTC-56-3, Erie county, New York, Bates & Rogers, Chicago, low on general contract.

500 tons, offices and other structures for Washington Water Power Co., Spokane, Wash.; bids Oct. 30.

500 tons, pumping plant, trashracks, gates and miscellaneous, some materials government furnished, Canyon Ferry, Mont., project; bids soon to Bureau of Reclamation, Canyon Ferry.

500 tons or more, Oregon state 1090-ft Yamhill river bridge; also three smaller spans; bids to Portland, Oreg., Nov. 8.

300 tons, power station, Ft. Meyer, Fla., bids asked through Ebasco Services, New York.

341 tons, tunnel and other work, Canyon Ferry, Mont., bids to Bureau of Reclamation, Canyon Ferry, Nov. 27.

215 tons, three-span rolled beam bridge, Norwalk, Conn.; also 75 tons, reinforcing bars, and 125 tons, steel piles.

240 tons, state bridge, Nassau county, New York, Tuckahoe Construction Co., and Davis Construction Co. low on a joint bid.

200 tons, two rolled beam bridges, Vernon, Conn., 55 tons, reinforcing bars, and 40 tons, steel piles.

200 tons, Helena Valley, Mont., pumping plant; bids to Bureau of Reclamation, Canyon Ferry, Mont., Dec. 4.

200 tons, repairs, Easton-Phillipsburg bridge, Delaware River Joint Toll Bridge Commission, Morrisville, Pa.; to be readvertised.

175 tons, state bridge, Frederick county, Maryland; bids closed Oct. 30.

## REINFORCING BARS . . .

### REINFORCING BARS PLACED

1250 tons, sheet steel piling, Corps of Engineers, St. Paul, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

1100 tons, maximum security building, St. Elizabeth's Hospital, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; William Cramer Co., Inc., Washington, general contractor.

320 tons, engineering school, University of

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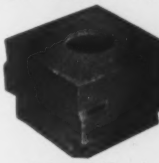

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280 tons, five state highway bridges, Spaulding turnpike, Rochester, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Frank Palazzi & Sons Inc., Johnston, R. I., general contractor.

128 tons, Gonzaga College dormitory, Spokane, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

196 tons, Washington state highway railroad bridge, Thurston county, to Bethlehem Pacific Coast Steel Corp., Seattle; John E. Alexander, Seattle, general contractor, low at $151,664.

### REINFORCING BARS PENDING

3200 tons, including shapes and plates, Swift dam, Lewis river, Washington; general contract at $18,272,000, awarded jointly to J. A. Jones Construction Co., Seattle, and Charles H. Thompkins Co., Washington, by Pacific Power & Light Co., Portland, Oreg.

600 tons, second unit of dam project, Ft. Peck, Mont.; low bidder claims error; U.S. Engineer considering second low.

375 tons, Helena Valley, Mont., pumping plant; bids to Bureau of Reclamation, Canyon Ferry, Mont., Dec. 4.

375 tons, Canyon Ferry power projects; bids soon to Bureau of Reclamation, Canyon Ferry, Mont.

150 tons, Washington state highway bridges, near Ft. Lewis; Woodworth & Co. Inc., Tacoma, Wash., low at $1,639,758; unstated structural tonnage also involved.

100 tons, two Buerau of Public Roads bridges, Douglas county, Oreg.; general contract to P. W. Hamer & Associates, Roseburg, Oreg., low at $223,978.

90 tons, also shapes, concrete piling and floor steel grids, Ketchikan, Alaska, waterfront project; bids to Alaska Public Works, Juneau, Alaska, Nov. 28.

## PLATES . . .

### PLATES PLACED

140 tons, water storage tank, Snohomish county P.U.D., Everett, Wash., to Chicago Bridge & Iron Co., Seattle.

### PLATES PENDING

7000 tons, proposed water supply improvement, Salem, Oreg.; bid call expected soon; Clark & Gross, engineer, Salem, Oreg.

1100 tons plus, Bureau of Reclamation storage tank, Bridgeport, Wash.; bids Nov. 15.

250 tons, Helena Valley, Mont., pumping project; bids to Bureau of Reclamation, Canyon Ferry, Mont., Dec. 4.

200 tons, Letterkenny Ordnance Depot, Chambersburg, Pa.; also 940 tons, hot-rolled sheets.

## PIPE . . .

### STEEL PIPE PENDING

2000 tons, 24-in. water pipe, Rockville, Md.; bids closed Oct. 30.

### CAST IRON PIPE PLACED

100 tons, Casitas dam, Bureau of Reclamation, Denver, Berkeley Steel Construction Co., Berkeley, Calif., low.

## RAILS, CARS . . .

### LOCOMOTIVES PENDING

Pennsylvania Railroad, fifty 1750-hp diesel locomotives.

### RAILROAD CARS PLACED

Santa Fe, 25 ninety-five-ton ore cars and 25 mechanical refrigerator cars, to company's own shops at Topeka and Wichita, Kans.

Canadian National, two coaches, two baggage cars and one dining car, to the National Steel Car Corp. Ltd., Hamilton, Ont.

### RAILS PENDING

1030 tons, 115-lb rail for S.P.&S. Railway track relocation, Ice Harbor project; Colorado Fuel & Iron Corp., Denver, reported low to U.S. Engineer, Walla Walla, Wash.

Northern Pacific Railway, 1700 tons of tie plates, to Bethlehem Pacific Coast Steel Corp., Seattle.

### Scramble for Nickel Goes On

18-8 Stainless Steel Scrap*

(Consumer prices per gross ton, bundles)

| | Oct. 24, 1956 | Jan. 4, 1956 | Per Cent Increase |
|---|---|---|---|
| Chicago | $515 | $350 | 47.1 |
| Cleveland | 500 | 345 | 44.9 |
| New York | 485 | 325 | 49.2 |
| Pittsburgh | 500 | 350 | 42.9 |

*Nickel bearing.

# Stainless Scrap Skyrockets

## Nickel shortage pushes prices to dizzy heights. Government diversion of stockpile-bound metal may help, but increased demand will keep 18-8 scrap at top levels

THE PRICE of nickel-bearing stainless scrap has gone so high that it's cutting the profit out of the nickel grades of stainless. The dilemma of the producers is shown by the table.

This grade of scrap is one of the sources of nickel for the production of stainless steel. The critical shortage of nickel in any form has caused the demand for and the price of stainless scrap to skyrocket. Although the price of 18-8 scrap has increased about 45 per cent since the beginning of the year, the nonnickel grade has gone up only about 9 per cent in Cleveland and Pittsburgh, while it has decreased slightly in Chicago and New York.

**Long Range**—The situation will not get any better within the foreseeable future. The nickel shortage is going to be with us possibly through 1960, according to Henry D. Lytton, former government metal specialist and now market consultant to industrial corporations. Mr. Lytton estimates that nickel demand for steelmaking will be 89,250 tons by 1965, while nonsteel uses will require 98,500 tons, making for a minimum requirement of 187,750 tons. This assumes adequate supplies, he says, but does not allow for any growth in new uses for nickel. The Office of Defense Mobilization has set an expansion goal of only 220,000 tons, which further indicates that his estimate is too low. "It is easy to see that nickel demand may soon surpass present consumption rates of 126,000 tons by at least 100,000 tons, without allowance for stockpiling," he says.

While the nickel shortage is the cause of the high scrap prices, the government stockpile is the cause of the nickel shortage, say most users. Pressure from all fronts has resulted in the announcement by ODM that an additional 5 million lb of nickel headed for stockpile will be diverted to industry in the fourth quarter. ODM also says it will not make a call for government account during the first quarter of 1957.

**Steady**—Most buyers hope the price will stop its wild climb. Crucible Steel Co. of America says that nickel in the stainless scrap form has risen to about three times the cost of primary metal. One rumor in Pittsburgh has it that producers of stainless are beginning to resist this high cost in the hope that the government's action will bring them some relief. Reports from Chicago indicate that the steady rise has halted, at least for the time being because of anticipated increases in virgin nickel supplies. But at least one Pittsburgh producer thinks the peak is yet to come.

The shortage hasn't been caused by any reduction in the amount of scrap generated. It has been the result of an over-all increase in demand. Shipments of stainless steel through the first eight months of this year are nearly equal to year-ago figures, and it's estimated that about 22 per cent of all stainless sold returns as scrap. There is a greater demand for stainless products with higher nickel content. To make up for their shortage of virgin metal, producers have had to turn to scrap.

**Effects**—This heavy demand is made to order for gray market and conversion operators. It has also widened the search for the material by long-time users. One Pittsburgh firm reportedly purchased scrap on the West Coast and paid a freight charge of $37 a ton to ship it to its mill.

With the supply critically short and demand always increasing, more and more stainless producers are taking the attitude expressed by Eastern Stainless Steel Corp.: "We are actively seeking solutions to these problems, but for the nearer future, at least, continuation of the tight nickel market is anticipated. . .Over the long run, prospects appear good for increasing the over-all supply of virgin nickel."

## Stainless Steel . . .

Stainless Steel Prices, Page 191

Although demand for nickel-bearing stainless remains extremely strong, producers complain that the high cost of scrap is making it difficult to produce those grades economically.

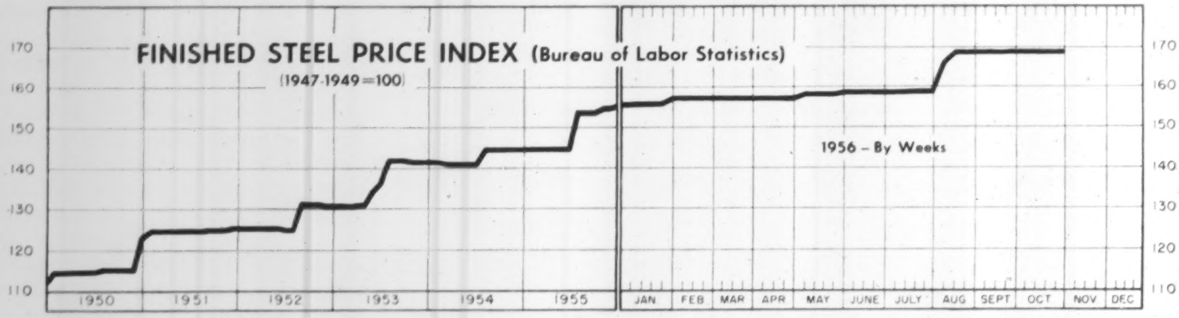
U.S. Steel Corp. issued a new price list for stainless steel, Oct. 24. It contains changes in two minor grades and follows revisions made by competitors earlier in the year.

## Rails, Cars . . .

Track Material Prices, Page 190

Bethlehem Pacific Coast Steel Corp. booked 1700 tons of tie plates for the Northern Pacific Railway, to be rolled at its Seattle plant. Other railroad requirements for 1957 are expected to be placed shortly.

# Price Indexes and Composites



| Oct. 30, 1956 | Week Ago | Month Ago | Oct. Avg. | Year Ago |
|---|---|---|---|---|
| **168.6** | **168.6** | **168.6** | **168.6** | **154.5** |

### AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

**Week Ended Oct. 30**

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

| | |
|---|---|
| Rails, Standard, No. 1 | $5.150 |
| Rails, Light, 40 lb | 6.567 |
| Tie Plates | 6.025 |
| Axles, Railway | 8.950 |
| Wheels, Freight Car, 33 in. (per wheel) | 57.50 |
| Plates, Carbon | 5.550 |
| Structural Shapes | 5.267 |
| Bars, Tool Steel, Carbon (lb) | 0.480 |
| Bars, Tool Steel Alloy, Oil Hardening Die (lb) | 0.585 |
| Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb) | 1.274 |
| Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb) | 1.769 |
| Bars, H.R., Alloy | 10.025 |
| Bars, H.R., Stainless, 303 (lb) | 0.483 |
| Bars, H.R., Carbon | 5.925 |
| Bars, Reinforcing | 5.738 |
| Bars, C.F., Carbon | 9.610 |
| Bars, C.F., Alloy | 13.275 |
| Bars, C.F., Stainless, 302 (lb) | 0.508 |
| Sheets, H.R., Carbon | 5.695 |
| Sheets, C.R., Carbon | 6.639 |
| Sheets, Galvanized | 8.220 |
| Sheets, C.R., Stainless, 302 (lb) | 0.635 |
| Sheets, Electrical | 11.225 |
| Strip, C.R., Carbon | 8.843 |
| Strip, C.R., Stainless, 403 (lb) | 0.475 |
| Strip, H.R., Carbon | 5.900 |
| Pipe, Black, Buttweld (100 ft) | 18.376 |
| Pipe, Galv., Buttweld (100 ft) | 22.516 |
| Pipe, Line (100 ft) | 182.860 |
| Casing, Oil Well, Carbon (100 ft) | 178.046 |
| Casing, Oil Well, Alloy (100 ft) | 276.870 |
| Tubes, Boiler (100 ft) | 45.033 |
| Tubing, Mechanical, Carbon (100 ft) | 22.973 |
| Tubing, Mechanical, Stainless, 304 (100 ft) | 187.133 |
| Tin Plate, Hot-dipped, 1.25 lb. | 9.333 |
| Tin Plate, Electrolytic, 0.25 lb | 8.033 |
| Black Plate, Canmaking Quality | 7.133 |
| Wire, Drawn, Carbon | 9.175 |
| Wire, Drawn, Stainless, 430 (lb) | 0.630 |
| Bale ties (bundle) | 7.213 |
| Nails, Wire, 8d Common | 9.368 |
| Wire, Barbed (80-rod spool) | 8.412 |
| Woven Wire Fence (20-rod roll) | 20.505 |

### STEEL's FINISHED STEEL PRICE INDEX*

| | Oct. 31 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Index (1935-39 av.=100) | 225.58 | 225.58 | 225.71 | 208.90 | 171.92 |
| Index in cents per lb | 6.111 | 6.111 | 6.114 | 5.659 | 4.657 |

### STEEL's ARITHMETICAL PRICE COMPOSITES

| | | | | | |
|---|---|---|---|---|---|
| Finished Steel, NT* | $137.48 | $137.48 | $137.75 | $128.14 | $106.32 |
| No. 2 Fdry Pig Iron, GT | 62.63 | 62.63 | 62.63 | 58.99 | 52.54 |
| Basic Pig Iron, GT | 62.18 | 62.18 | 62.18 | 58.49 | 52.16 |
| Malleable Pig Iron, GT | 63.41 | 63.41 | 63.41 | 59.77 | 53.27 |
| Steelmaking Scrap, GT | 58.67 | 57.00 | 57.00 | 45.17 | 43.00 |

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

# Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

| FINISHED STEEL | Oct. 31 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bars, H.R., Pittsburgh | 5.075 | 5.075 | 5.075 | 4.65 | 3.70 |
| Bars, H.R., Chicago | 5.075 | 5.075 | 5.075 | 4.65 | 3.70 |
| Bars, H.R., deld., Philadelphia | 4.93 | 4.93 | 4.93 | 4.90 | 4.223 |
| Bars, C.F., Pittsburgh | 6.85* | 6.85* | 6.85* | 5.90 | 4.55 |
| Shapes, Std., Pittsburgh | 5.00 | 5.00 | 5.00 | 4.60 | 3.65 |
| Shapes, Std., Chicago | 5.00 | 5.00 | 5.00 | 4.60 | 3.65 |
| Shapes, deld., Philadelphia | 5.00 | 5.00 | 5.00 | 4.88 | 3.918 |
| Plates, Pittsburgh | 4.85 | 4.85 | 4.85 | 4.50 | 3.70 |
| Plates, Chicago | 4.85 | 4.85 | 4.85 | 4.50 | 3.70 |
| Plates, Coatesville, Pa. | 5.25 | 5.25 | 5.25 | 4.80 | 4.15 |
| Plates, Sparrows Point, Md. | 4.85 | 4.85 | 4.85 | 4.50 | 3.70 |
| Plates, Claymont, Del. | 5.35 | 5.35 | 5.35 | 4.80 | 4.15 |
| Sheets, H.R., Pittsburgh | 4.675 | 4.675 | 4.675 | 4.325 | 3.60-3.75 |
| Sheets, H.R., Chicago | 4.675 | 4.675 | 4.675 | 4.325 | 3.60 |
| Sheets, C.R., Pittsburgh | 5.75 | 5.75 | 5.75 | 5.325 | 4.35 |
| Sheets, C.R., Chicago | 5.75 | 5.75 | 5.75 | 5.325 | 4.35 |
| Sheets, C.R., Detroit | 5.75-5.85 | 5.75-5.85 | 5.75-5.85 | 5.325-5.425 | 4.55 |
| Sheets, Galv., Pittsburgh | 6.30 | 6.30 | 6.30 | 5.85 | 4.80 |
| Strip, H.R., Pittsburgh | 4.675 | 4.675 | 4.675 | 4.325 | 3.75-4.00 |
| Strip, H.R., Chicago | 4.675 | 4.675 | 4.675 | 4.325 | 3.50 |
| Strip, C.R., Pittsburgh | 6.85 | 6.85 | 6.85 | 6.25 | 4.65-5.35 |
| Strip, C.R., Chicago | 6.85 | 6.85 | 6.85 | 6.35 | 4.90 |
| Strip, C.R., Detroit | 6.95 | 6.95 | 6.95 | 6.35 | 4.85-5.60 |
| Wire, Basic, Pittsburgh | 7.20 | 7.20 | 7.20 | 6.25 | 4.85-5.10 |
| Nails, Wire, Pittsburgh | 8.20 | 8.20 | 8.35 | 7.60 | 5.90-6.20 |
| Tin plate (1.50 lb), box, Pitts. | $9.85 | $9.85 | $9.85 | $9.45 | $8.70 |

*Including 0.35c for special quality

### SEMIFINISHED STEEL

| | | | | | |
|---|---|---|---|---|---|
| Billets, forging, Pitts. (NT) | $91.50 | $91.50 | $91.50 | $84.50 | $66.00 |
| Wire rods, $\frac{7}{32}$-⅜" Pitts. | 5.80 | 5.80 | 5.80 | 5.025 | 4.10-4.30 |

| PIG IRON, Gross Ton | Oct. 31 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bessemer, Pitts. | $63.50 | $63.50 | $63.50 | $59.50 | $53.00 |
| Basic, Valley | 62.50 | 62.50 | 62.50 | 58.50 | 52.00 |
| Basic, deld. Phila. | 66.26 | 66.26 | 66.26 | 62.16 | 56.61 |
| No. 2 Fdry, NevilleIsland, Pa. | 63.00 | 63.00 | 63.00 | 59.00 | 52.50 |
| No. 2 Fdry, Chicago | 63.00 | 63.00 | 63.00 | 59.00 | 52.50 |
| No. 2 Fdry, deld. Phila. | 66.76 | 66.76 | 66.76 | 62.66 | 57.11 |
| No. 2 Fdry, Birm. | 59.00 | 59.00 | 59.00 | 55.00 | 48.88 |
| No. 2 Fdry (Birm.) deld. Cin. | 66.70 | 66.70 | 66.70 | 62.70 | 55.49 |
| Malleable, Valley | 63.00 | 63.00 | 63.00 | 59.00 | 52.50 |
| Malleable, Chicago | 63.00 | 63.00 | 63.00 | 59.00 | 52.50 |
| Ferromanganese, Duquesne. | 235.00† | 235.00† | 235.00† | 190.00† | 188.00* |

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

### SCRAP, Gross Ton (including broker's commission)

| | | | | | |
|---|---|---|---|---|---|
| No. 1 Heavy Melt, Pittsburgh | $57.50 | $55.50 | $56.50 | $44.50 | $44.00 |
| No. 1 Heavy Melt, E. Pa. | 57.50 | 57.50 | 56.50 | 46.50 | 42.50 |
| No. 1 Heavy Melt, Chicago | 61.00 | 58.00 | 58.00 | 44.50 | 42.50 |
| No. 1 Heavy Melt, Valley | 66.50 | 63.50 | 64.50 | 48.00 | 44.00 |
| No. 1 Heavy Melt, Cleve. | 65.00 | 61.50 | 63.00 | 45.50 | 43.00 |
| No. 1 Heavy Melt, Buffalo | 57.50 | 57.50 | 57.50 | 43.50 | 43.00 |
| Rails, Rerolling, Chicago | 87.50 | 84.00 | 83.00 | 65.50 | 52.50 |
| No. 1 Cast, Chicago | 50.50 | 50.50 | 51.50 | 47.50 | 49.00 |

### COKE, Net Ton

| | | | | | |
|---|---|---|---|---|---|
| Beehive, Furn, Connlsvl. | $14.50 | $14.50 | $14.50 | $13.625 | $14.75 |
| Beehive, Fdry, Connlsvl. | 17.50 | 17.50 | 17.50 | 16.50 | 17.50 |

# Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 188; to footnotes, page 190.

## SEMIFINISHED

### INGOTS, Carbon, Forging (NT)

| | |
|---|---|
| Munhall,Pa. U5 | $70.50 |

### INGOTS, Alloy (NT)

| | |
|---|---|
| Detroit R7 | $74.00 |
| Houston S5 | 74.00 |
| Midland,Pa. C18 | 74.00 |
| Munhall,Pa. U5 | 74.00 |

### BILLETS, BLOOMS & SLABS
### Carbon, Rerolling (NT)

| | |
|---|---|
| Aliquippa,Pa. J5 | $74.00 |
| Bessemer,Pa. U5 | 74.00 |
| Bridgeport,Conn. N19 | 79.00 |
| Buffalo R2 | 74.00 |
| Clairton,Pa. U5 | 74.00 |
| Ensley,Ala. T2 | 74.00 |
| Fairfield,Ala. T2 | 74.00 |
| Fontana,Calif. K1 | 83.50 |
| Gary,Ind. U5 | 74.00 |
| Johnstown,Pa. B2 | 74.00 |
| Lackawanna,N.Y. B2 | 74.00 |
| LoneStar,Tex. L6 | 80.00 |
| Munhall,Pa. U5 | 74.00 |
| Pittsburgh J5 | 74.00 |
| S.Chicago,Ill. R2, U5 | 74.00 |
| S.Duquesne,Pa. U5 | 74.00 |
| Sterling,Ill. N15 | 74.00 |
| Youngstown R2 | 74.00 |

### Carbon, Forging (NT)

| | |
|---|---|
| Aliquippa,Pa. J5 | $91.50 |
| Bessemer,Pa. U5 | 91.50 |
| Bridgeport,Conn. N19 | 96.50 |
| Buffalo R2 | 91.50 |
| Canton,O. R2 | 94.00 |
| Clairton,Pa. U5 | 91.50 |
| Conshohocken,Pa. A3 | 96.50 |
| Ensley,Ala. T2 | 91.50 |
| Fairfield,Ala. T2 | 91.50 |
| Fontana,Calif. K1 | 101.00 |
| Gary,Ind. U5 | 91.50 |
| Geneva,Utah C11 | 91.50 |
| Houston S5 | 96.50 |
| Johnstown,Pa. B2 | 91.50 |
| Lackawanna,N.Y. B2 | 91.50 |
| LosAngeles B3 | 101.00 |
| Midland,Pa. C18 | 91.50 |
| Munhall,Pa. U5 | 91.50 |
| Pittsburgh J5 | 91.50 |
| Seattle B3 | 105.00 |
| S.Chicago R2, U5, W14 | 91.50 |
| S.Duquesne,Pa. U5 | 91.50 |
| S.SanFrancisco B3 | 101.00 |

### Alloy, Forging (NT)

| | |
|---|---|
| Bethlehem,Pa. B2 | $107.00 |
| Bridgeport,Conn. N19 | 107.00 |
| Buffalo R2 | 107.00 |
| Canton,O. R2 | 107.00 |
| Conshohocken,Pa. A3 | 114.00 |
| Detroit R7 | 107.00 |
| Fontana,Calif. K1 | 128.00 |
| Gary,Ind. U5 | 107.00 |
| Houston S5 | 112.00 |
| Ind.Harbor,Ind. Y1 | 107.00 |
| Johnstown,Pa. B2 | 107.00 |
| Lackawanna,N.Y. B2 | 107.00 |
| LosAngeles B3 | 127.00 |
| Massillon,O. R2 | 107.00 |
| Midland,Pa. C18 | 107.00 |
| Munhall,Pa. U5 | 107.00 |
| S.Chicago R2,U5,W14 | 107.00 |
| S.Duquesne,Pa. U5 | 107.00 |
| Struthers,O. Y1 | 107.00 |
| Warren,O. C17 | 107.00 |

### ROUNDS, SEAMLESS TUBE (NT)

| | |
|---|---|
| Bridgeport,Conn. N19 | $116.50 |
| Buffalo R2 | 111.50 |
| Canton,O. R2 | 114.00 |
| Cleveland R2 | 111.50 |
| Gary,Ind. U5 | 111.50 |
| S.Chicago,Ill. R2, W14 | 111.50 |
| S.Duquesne,Pa. U5 | 111.50 |

### SKELP

| | |
|---|---|
| Aliquippa,Pa. J5 | 4.725 |
| LoneStar,Tex. L6 | 5.025 |
| Munhall,Pa. U5 | 4.625 |
| SparrowsPoint,Md. B2 | 4.625 |
| Warren,O. R2 | 4.625 |
| Youngstown R2, U5 | 4.625 |

### WIRE RODS

| | |
|---|---|
| AlabamaCity,Ala. R2 | 5.80 |
| Aliquippa,Pa. J5 | 5.80 |
| Alton,Ill. L1 | 6.00 |
| Buffalo W12 | 5.80 |
| Cleveland A7 | 5.80 |
| Donora,Pa. A7 | 5.80 |
| Fairfield,Ala. T2 | 5.80 |
| Houston S5 | 6.05 |
| IndianaHarbor,Ind. Y1 | 5.80 |
| Johnstown,Pa. B2 | 5.80 |
| Joliet,Ill. A7 | 5.80 |
| KansasCity,Mo. S5 | 6.05 |
| Kokomo,Ind. C16 | 5.90 |
| LosAngeles B3 | 6.60 |
| Minnequa,Colo. C10 | 6.05 |
| Monessen,Pa. P7 | 5.80 |
| N.Tonawanda,N.Y. B11 | 5.80 |
| Pittsburg,Calif. C11 | 6.45 |
| Portsmouth,O. P12 | 5.80 |
| Roebling,N.J. R5 | 5.90 |
| S.Chicago,Ill. R2 | 5.80 |
| SparrowsPoint,Md. B2 | 5.90 |
| Sterling,Ill.(1) N15 | 5.80 |
| Sterling,Ill. N15 | 5.90 |
| Struthers,O. Y1 | 5.80 |
| Worcester,Mass. A7 | 6.10 |

## STRUCTURALS

### Carbon Steel Std. Shapes

| | |
|---|---|
| Ala.City,Ala. R2 | 5.00 |
| Aliquippa,Pa. J5 | 5.00 |
| Bessemer,Ala. T2 | 5.00 |
| Bethlehem,Pa. B2 | 5.05 |
| Birmingham C15 | 5.30 |
| Clairton,Pa. U5 | 5.00 |
| Fairfield,Ala. T2 | 5.00 |
| Fontana,Calif. K1 | 5.70 |
| Gary,Ind. U5 | 5.00 |
| Geneva,Utah C11 | 5.00 |
| Houston S5 | 5.10 |
| Ind.Harbor,Ind. I-2 | 5.00 |
| Johnstown,Pa. B2 | 5.05 |
| KansasCity,Mo. S5 | 5.10 |
| Lackawanna,N.Y. B2 | 5.05 |
| LosAngeles B3 | 5.70 |
| Minnequa,Colo. C10 | 5.30 |
| Munhall,Pa. U5 | 5.00 |
| Niles,Calif. P1 | 5.75 |
| Phoenixville,Pa. P4 | 5.85 |
| Portland,Oreg. O4 | 5.80 |
| Seattle B3 | 5.75 |
| S.Chicago,Ill. U5, W14 | 5.00 |
| S.SanFrancisco B3 | 5.65 |
| Sterling,Ill. N15 | 5.00 |
| Torrance,Calif. C11 | 5.70 |
| Weirton,W.Va. W6 | 5.00 |

### Wide Flange

| | |
|---|---|
| Bethlehem,Pa. B2 | 5.05 |
| Clairton,Pa. U5 | 5.00 |
| Fontana,Calif. K1 | 5.85 |
| IndianaHarbor,Ind. I-2 | 5.00 |
| Lackawanna,N.Y. B2 | 5.05 |
| Munhall,Pa. U5 | 5.00 |
| Phoenixville,Pa. P4 | 5.85 |
| S.Chicago,Ill. U5 | 5.00 |

### Alloy Std. Shapes

| | |
|---|---|
| Clairton,Pa. U5 | 6.20 |
| Gary,Ind. U5 | 6.20 |
| Houston S5 | 6.30 |
| Munhall,Pa. U5 | 6.20 |
| S.Chicago,Ill. U5 | 6.20 |

### H.S., L.A. Std. Shapes

| | |
|---|---|
| Aliquippa,Pa. J5 | 7.35 |
| Bessemer,Ala. T2 | 7.35 |
| Bethlehem,Pa. B2 | 7.40 |
| Clairton,Pa. U5 | 7.35 |
| Fairfield,Ala. T2 | 7.35 |
| Fontana,Calif. K1 | 8.05 |
| Gary,Ind. U5 | 7.35 |
| Geneva,Utah C11 | 7.35 |
| Houston S5 | 7.45 |
| Ind.Harbor,Ind. I-2, Y1 | 7.35 |
| Johnstown,Pa. B2 | 7.40 |
| KansasCity,Mo. S5 | 7.45 |
| Lackawanna,N.Y. B2 | 7.40 |
| LosAngeles B3 | 8.05 |
| Munhall,Pa. U5 | 7.35 |
| Seattle B3 | 8.10 |
| S.Chicago,Ill. U5, W14 | 7.35 |
| S.SanFrancisco B3 | 8.00 |
| Struthers,O. Y1 | 7.35 |

### H.S., L.A. Wide Flange

| | |
|---|---|
| Bethlehem,Pa. B2 | 7.40 |
| Ind.Harbor,Ind. I-2 | 7.35 |
| Lackawanna,N.Y. B2 | 7.40 |
| Munhall,Pa. U5 | 7.35 |
| S.Chicago,Ill. U5 | 7.35 |

## PILING

### BEARING PILES

| | |
|---|---|
| Bethlehem,Pa. B2 | 5.05 |
| Lackawanna,N.Y. B2 | 5.05 |
| Munhall,Pa. U5 | 5.00 |
| S.Chicago,Ill. U5 | 5.00 |

### STEEL SHEET PILING

| | |
|---|---|
| Ind.Harbor,Ind. I-2 | 5.90 |
| Lackawanna,N.Y. B2 | 5.90 |
| Munhall,Pa. U5 | 5.90 |
| S.Chicago,Ill. U5 | 5.90 |

## PLATES

### PLATES, Carbon Steel

| | |
|---|---|
| Ala.City,Ala. R2 | 4.85 |
| Aliquippa,Pa. J5 | 4.85 |
| Ashland,Ky. (15) A10 | 4.85 |
| Bessemer,Ala. T2 | 4.85 |
| Bridgeport,Conn. N19 | 4.75 |
| Clairton,Pa. U5 | 4.85 |
| Claymont,Del. C22 | 5.35 |
| Cleveland J5, R2 | 4.95 |
| Coatesville,Pa. L7 | 5.25 |
| Conshohocken,Pa. A3 | 4.90 |
| *Detroit M1* | *4.95* |
| Ecorse,Mich. G5 | 4.95 |
| Fairfield,Ala. T2 | 4.85 |
| Fontana,Calif.(30) K1 | 5.55 |
| Gary,Ind. U5 | 4.85 |
| Geneva,Utah C11 | 4.85 |
| GraniteCity,Ill. G4 | 5.05 |
| Harrisburg,Pa. P4 | 5.80 |
| Houston S5 | 4.95 |
| Ind.Harbor,Ind. I-2, Y1 | 4.85 |
| Johnstown,Pa. B2 | 4.85 |
| Lackawanna,N.Y. B2 | 4.85 |
| LoneStar,Tex. L6 | 5.20 |
| Minnequa,Colo. C10 | 5.70 |
| Munhall,Pa. U5 | 4.85 |
| Newport,Ky. N9 | 4.85 |
| Pittsburgh J5 | 4.85 |
| Riverdale,Ill. A1 | 4.85 |
| Seattle B3 | 5.75 |
| Sharon,Pa. S3 | 4.85 |
| S.Chicago,Ill. U5, W14 | 4.85 |
| SparrowsPoint,Md. B2 | 4.85 |
| Steubenville,O. W10 | 4.85 |
| Warren,O. R2 | 4.85 |
| Weirton,W.Va. W6 | 4.85 |
| Youngstown R2, U5, Y1 | 4.85 |

### PLATES, Carbon Abras. Resist.

| | |
|---|---|
| Claymont,Del. C22 | 6.20 |
| Fontana,Calif. K1 | 6.70 |
| Geneva,Utah C11 | 6.00 |
| Johnstown,Pa. B2 | 5.65 |
| SparrowsPoint,Md. B2 | 5.65 |

### PLATES, Wrought Iron

| | |
|---|---|
| Economy,Pa. B14 | 11.128 |

### PLATES,High-Strength Low-Alloy

| | |
|---|---|
| Aliquippa,Pa. J5 | 7.25 |
| Bessemer,Ala. T2 | 7.25 |
| Clairton,Pa. U5 | 7.25 |
| Claymont,Del. C22 | 7.55 |
| Cleveland J5, R2 | 7.25 |
| Coatesville,Pa. L7 | 7.55 |
| Conshohocken,Pa. A3 | 7.25 |
| Ecorse,Mich. G5 | 7.35 |
| Fairfield,Ala. T2 | 7.25 |
| Fontana,Calif.(30) K1 | 7.95 |
| Gary,Ind. U5 | 7.25 |
| Geneva,Utah C11 | 7.25 |
| Houston S5 | 7.35 |
| Ind.Harbor,Ind. I-2, Y1 | 7.25 |
| Johnstown,Pa. B2 | 7.25 |
| Munhall,Pa. U5 | 7.25 |
| Pittsburgh J5 | 7.25 |
| Seattle B3 | 8.15 |
| Sharon,Pa. S3 | 7.25 |
| S.Chicago,Ill. U5, W14 | 7.25 |
| SparrowsPoint,Md. B2 | 7.25 |
| Warren,O. R2 | 7.25 |
| Youngstown U5, Y1 | 7.25 |

### PLATES, Alloy

| | |
|---|---|
| Bridgeport,Conn. N19 | 6.55 |
| Claymont,Del. C22 | 6.85 |
| Coatesville,Pa. L7 | 6.85 |
| Fontana,Calif.(30) K1 | 7.55 |
| Gary,Ind. U5 | 6.85 |
| Houston S5 | 6.95 |
| Ind.Harbor,Ind. Y1 | 6.85 |
| Johnstown,Pa. B2 | 6.85 |
| Munhall,Pa. U5 | 6.85 |
| Newport,Ky. N9 | 6.85 |
| Seattle B3 | 7.75 |
| Sharon,Pa. S3 | 6.85 |
| S.Chicago,Ill. U5, W14 | 6.85 |
| SparrowsPoint,Md. B2 | 6.85 |
| Youngstown Y1 | 6.85 |

### FLOOR PLATES

| | |
|---|---|
| Cleveland J5 | 5.925 |
| Conshohocken,Pa. A3 | 5.925 |
| Harrisburg,Pa. P4 | 6.275 |
| Ind.Harbor,Ind. I-2 | 5.925 |
| Munhall,Pa. U5 | 5.925 |
| S.Chicago,Ill. U5 | 5.925 |

### PLATES, Ingot Iron

| | |
|---|---|
| Ashland c.l. (15) A10 | 5.10 |
| Ashland l.c.l. (15) A10 | 5.60 |
| Cleveland c.l. R2 | 5.60 |
| Warren,O. c.l. R2 | 5.60 |

## BARS

### BARS, Hot-Rolled Carbon (Merchant Quality)

| | |
|---|---|
| Ala.City,Ala.(9) R2 | 5.075 |
| Aliquippa,Pa.(9) J5 | 5.075 |
| Alton,Ill. L1 | 5.275 |
| Atlanta(9) A11 | 5.575 |
| Bessemer,Ala.(9) T2 | 5.075 |
| Birmingham(9) C15 | 5.375 |
| Bridgeport,Conn. N19 | 5.30 |
| Buffalo(9) R2 | 5.075 |
| Clairton,Pa. U5 | 5.075 |
| Cleveland(9) R2 | 5.075 |
| Ecorse,Mich.(9) G5 | 5.175 |
| Emeryville,Calif. J7 | 5.85 |
| Fairfield,Ala.(9) T2 | 5.075 |
| Fairless,Pa.(9) U5 | 5.225 |
| Fontana,Calif.(9) K1 | 5.775 |
| Gary,Ind.(9) U5 | 5.075 |
| Geneva,Utah(9) C11 | 5.157 |
| Houston(9) S5 | 5.325 |
| Ind.Harbor(9) I-2, Y1 | 5.075 |
| Johnstown,Pa.(9) B2 | 5.075 |
| Joliet,Ill. P22 | 5.575 |
| KansasCity,Mo.(9) S5 | 5.325 |
| Lackawanna(9) B2 | 5.075 |
| LosAngeles(9) B3 | 5.775 |
| Midland,Pa.(9) C18 | 5.425 |
| Milton,Pa.(23) M18 | 5.425 |
| Minnequa,Colo. C10 | 5.525 |
| Niles,Calif. P1 | 5.85 |
| N.T'wanda,N.Y.(9)B11 | 5.075 |
| Pittsburg,Calif.(9) C11 | 5.775 |
| Pittsburgh(9) J5 | 5.075 |
| Porland,Oreg. O4 | 5.85 |
| Seattle B3, N14 | 5.825 |
| S.Ch'c'go(9) R2,U5,W14 | 5.075 |
| S.Duquesne,Pa.(9) U5 | 5.075 |
| S.SanFran.,Calif.(9) B3 | 5.825 |
| Sterling,Ill.(1) N15 | 5.075 |
| Sterling,Ill. N15 | 5.175 |
| Struthers,O. Y1 | 5.075 |
| Torrance,Calif.(9) C11 | 5.775 |
| Weirton,W.Va.(9)W6 | 5.075 |
| Youngstown(9) R2, U5 | 5.075 |

### BARS, H.R. Leaded Alloy (Including leaded extra)

| | |
|---|---|
| Warren,O. C17 | 7.125 |

### BARS, Hot-Rolled Alloy

| | |
|---|---|
| Bethlehem,Pa. B2 | 6.125 |
| Bridgeport,Conn. N19 | 6.20 |
| Buffalo R2 | 6.125 |
| Canton,O. R2 | 6.125 |
| Clairton,Pa. U5 | 6.125 |
| Detroit R7 | 6.125 |
| Ecorse,Mich. G5 | 6.225 |
| Fairless,Pa. U5 | 6.275 |
| Fontana,Calif. K1 | 7.175 |
| Gary,Ind. U5 | 6.125 |
| Houston S5 | 6.375 |
| Ind.Harbor,Ind. I-2,Y1 | 6.125 |
| Johnstown,Pa. B2 | 6.125 |
| KansasCity,Mo. S5 | 6.375 |
| Lackawanna,N.Y. B2 | 6.125 |
| LosAngeles B3 | 7.175 |
| Massillon,O. R2 | 6.125 |
| Midland,Pa. C18 | 6.125 |
| S.Chicago R2, U5, W14 | 6.125 |
| S.Duquesne,Pa. U5 | 6.125 |
| Struthers,O. Y1 | 6.125 |
| Warren,O. C17 | 6.125 |
| Youngstown U5 | 6.125 |

### BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

| | |
|---|---|
| Aliquippa,Pa. J5 | 7.425 |
| Bessemer,Ala. T2 | 7.425 |
| Bethlehem,Pa. B2 | 7.425 |
| Bridgeport,Conn. N19 | 7.50 |
| Clairton,Pa. U5 | 7.425 |
| Cleveland R2 | 7.425 |
| Ecorse,Mich. G5 | 7.525 |
| Fairfield,Ala. T2 | 7.425 |
| Fontana,Calif K1 | 8.125 |
| Gary,Ind. U5 | 7.425 |
| Houston S5 | 7.675 |
| Ind.Harbor,Ind. Y1 | 7.425 |
| Johnstown,Pa. B2 | 7.425 |
| KansasCity,Mo. S5 | 7.675 |
| Lackawanna,N.Y. B2 | 7.425 |
| LosAngeles B3 | 8.125 |
| Pittsburgh J5 | 7.425 |
| Seattle B3 | 8.175 |
| S.Chicago,Ill. U5, W14 | 7.425 |
| S.Duquesne,Pa. U5 | 7.425 |
| S.SanFrancisco B3 | 8.175 |
| Struthers,O. Y1 | 7.425 |
| Youngstown U5 | 7.425 |

### BAR SIZE ANGLES; H.R. Carbon

| | |
|---|---|
| Bethlehem,Pa.(9) B2 | 5.225 |
| Houston S5 | 5.325 |
| KansasCity,Mo. | 5.325 |
| Lackawanna(9) B2 | 5.075 |
| Sterling,Ill. N15 | 5.175 |
| Sterling,Ill(1) N15 | 5.075 |

### BAR SIZE ANGLES; S. Shapes

| | |
|---|---|
| Aliquippa,Pa. J5 | 5.075 |
| Atlanta A11 | 5.575 |
| Joliet,Ill. P22 | 5.10 |
| Niles,Calif. P1 | 5.85 |
| Pittsburgh J5 | 5.075 |
| Portland,Oreg. O4 | 5.85 |
| SanFrancisco S7 | 5.95 |

### BAR SHAPES, Hot-Rolled Alloy

| | |
|---|---|
| Clairton,Pa. U5 | 6.20 |
| Gary,Ind. U5 | 6.20 |
| Houston S5 | 6.45 |
| KansasCity,Mo. S5 | 6.45 |
| Youngstown U5 | 6.20 |

### BARS, C.F. Leaded Alloy (Including leaded extra)

| | |
|---|---|
| Ambridge,Pa. W18 | 9.225 |
| Chicago W18 | 9.225 |
| Cleveland C20 | 9.475 |
| LosAngeles S30 | 11.10 |
| LosAngeles P2 | 11.00 |
| Monaca,Pa. S17 | 9.225 |
| Newark,N.J. W18 | 9.40 |
| Warren,O. C17 | 9.475 |

### BARS, Cold-Finished Carbon

| | |
|---|---|
| Ambridge,Pa. W18 | 6.85 |
| BeaverFalls,Pa. M12,R2 | 6.85 |
| Bridgeport,Conn. N19 | 7.20 |
| Buffalo B5 | 6.90 |
| Camden,N.J. P13 | 7.30 |
| Carnegie,Pa. C12 | 6.85 |
| Chicago W18 | 6.85 |
| Cleveland A7, C20 | 6.85 |
| Detroit B5, P17 | 7.05 |
| Detroit R7 | 6.85 |
| Donora,Pa. A7 | 6.85 |
| Elyria,O. W8 | 6.85 |
| FranklinPrk,Ill. N5 | 6.85 |
| Gary,Ind. U5 | 6.85 |
| GreenBay,Wis. F7 | 6.85 |
| Hammond,Ind. L2, M13 | 6.85 |
| Hartford,Conn. R2 | 7.35 |
| Harvey,Ill. B5 | 6.85 |
| LosAngeles(49) S30 | 8.30 |
| LosAngeles P2, R2 | 8.30 |
| Mansfield,Mass. B5 | 7.40 |
| Massillon,O. R2, R8 | 6.85 |
| Midland,Pa. C18 | 6.85 |
| Monaca,Pa. S17 | 6.85 |
| Newark,N.J. W18 | 7.30 |
| NewCastle,Pa.(17) B4 | 6.85 |
| Pittsburg J5 | 6.85 |
| Plymouth,Mich. P5 | 7.10 |
| Putnam,Conn. W18 | 7.40 |
| Readville,Mass. C14 | 7.40 |
| S.Chicago,Ill. W14 | 6.85 |
| SpringCity,Pa. K3 | 7.30 |
| Struthers,O. Y1 | 6.85 |
| Waukegan,Ill. A7 | 6.85 |
| Youngstown F3, Y1 | 6.85 |

### BARS, Cold-Finished Carbon (Turned and Ground)

| | |
|---|---|
| Cumberland,Md.(5) C19 | 6.10 |

### BARS, Cold-Finished Alloy

| | |
|---|---|
| Ambridge,Pa. W18 | 8.325 |
| BeaverFalls,Pa. M12,R2 | 8.325 |
| Bethlehem,Pa. B2 | 8.325 |
| Bridgeport,Conn. N19 | 8.475 |
| Buffalo B5 | 8.325 |
| Camden,N.J. P13 | 8.50 |
| Canton,O. T7 | 7.425 |
| Carnegie,Pa. C12 | 8.325 |
| Chicago W18 | 8.325 |
| Cleveland A7, C20 | 8.325 |
| Detroit B5, P17 | 8.525 |
| Detroit R7 | 8.325 |
| Donora,Pa. A7 | 8.325 |
| Elyria,O. W8 | 8.325 |
| FranklinPark,Ill. N5 | 8.325 |
| Gary,Ind. R2 | 8.325 |
| GreenBay,Wis. F7 | 8.325 |
| Hammond,Ind. L2,M13 | 8.325 |
| Hartford,Conn. R2 | 8.625 |
| Harvey,Ill B5 | 8.325 |
| Lackawanna,N.Y. B2 | 8.325 |
| LosAngeles P2, S30 | 10.10 |
| Mansfield,Mass. B5 | 8.625 |
| Massillon,O. R2, R8 | 8.325 |
| Midland,Pa. C18 | 8.325 |
| Monaca,Pa. S17 | 8.325 |
| Newark,N.J. W18 | 8.50 |
| Plymouth,Mich. P5 | 8.525 |
| S.Chicago W14 | 8.325 |
| SpringCity,Pa. K3 | 8.50 |
| Struthers,O. Y1 | 8.325 |
| Warren,O. C17 | 8.325 |
| Waukegan,Ill. A7 | 8.325 |
| Worcester,Mass. A7 | 8.625 |
| Youngstown F3, Y1 | 8.325 |

### BARS, Reinforcing (To Fabricators)

| | |
|---|---|
| Ala.City,Ala. R2 | 5.075 |
| Atlanta A11 | 5.575 |
| Birmingham C15 | 5.375 |
| Bridgeport,Conn. N19 | 5.30 |
| Buffalo R2 | 5.075 |
| Cleveland R2 | 5.075 |
| Ecorse,Mich. G5 | 5.425 |
| Emeryville,Calif. J7 | 5.85 |
| Fairfield,Ala. T2 | 5.075 |
| Fairless,Pa. U5 | 5.225 |

| | | |
|---|---|---|
| Ft.Worth,Tex.(42) | T4 | 5.525 |
| Gary,Ind. | U5 | 5.075 |
| Houston | S5 | 5.325 |
| Ind.Harbor,Ind. | I-2, Y1 | 5.075 |
| Johnstown,Pa. | B2 | 5.075 |
| Joliet,Ill. | P22 | 5.575 |
| KansasCity,Mo. | S5 | 5.325 |
| Lackawanna,N.Y. | B2 | 5.075 |
| LosAngeles | B3 | 5.775 |
| Milton,Pa. | M18 | 5.225 |
| Minnequa,Colo. | C10 | 5.525 |
| Niles,Calif. | P1 | 5.85 |
| Pittsburg,Calif. | C11 | 5.775 |
| Pittsburgh | J5 | 5.075 |
| Portland,Oreg. | O4 | 5.85 |
| SandSprings,Okla. | S5 | 5.575 |
| Seattle | B3, N14 | 5.825 |
| S.Chicago,Ill. | R2 | 5.075 |
| S.Duquesne,Pa. | U5 | 5.075 |
| S.SanFrancisco | B3 | 5.825 |
| SparrowsPoint,Md. | B2 | 5.075 |
| Sterling,Ill.(1) | N15 | 5.075 |
| Sterling,Ill. | N15 | 5.175 |
| Struthers,O. | Y1 | 5.075 |
| Torrance,Calif. | C11 | 5.775 |
| Youngstown | R2, U5 | 5.075 |

### BARS, Reinforcing (Fabricated; to Consumers)

| | | |
|---|---|---|
| Chicago | U8 | 6.81 |
| Cleveland | U8 | 6.79 |
| Johnstown,Pa. ¼-1" | B2 | 6.73 |
| *KansasCity,Mo.* | *S5* | *7.00* |
| Marion,O. | P11 | 6.70 |
| New York | U8 | 7.18 |
| Pittsburgh | U8 | 6.75 |
| Seattle | B3, N14 | 7.20 |
| SparrowsPt. ½-1" | B2 | 6.73 |
| Williamsport,Pa. | S19 | 6.65 |

### RAIL STEEL BARS

| | | |
|---|---|---|
| ChicagoHts.(3) | C2, I-2 | 5.075 |
| ChicagoHts.(4) | I-2 | 5.075 |
| ChicagoHts.(4) | C2 | 5.65 |
| Ft.Worth,Tex.(26) | T4 | 5.525 |
| Franklin,Pa.(4) | F5 | 5.60 |
| Franklin,Pa.(3) | F5 | 5.10 |
| JerseyShore,Pa.(4) | J8 | 5.00 |
| Marion,O. (3) | P11 | 5.15 |
| Moline,Ill.(3) | R2 | 5.225 |
| Tonawanda(3) | B12 | 5.65 |
| Tonawanda(4) | B12 | 6.15 |
| Williamsport,Pa.(3) | S19 | 5.65 |

### BARS, Wrought Iron

| | | |
|---|---|---|
| Economy,Pa.(S.R.) | B14 | 12.305 |
| Economy,Pa.(D.R.) | B14 | 15.301 |
| Economy(Staybolt) | B14 | 15.676 |
| McK.Rks.(S.R.) | L5 | 13.15 |
| McK.Rks.(D.R.) | L5 | 18.00 |
| McK.Rks.(Staybolt) | L5 | 19.50 |

## SHEETS

### SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

| | | |
|---|---|---|
| Ala.City,Ala. | R2 | 4.675 |
| Allenport,Pa. | P7 | 4.675 |
| Ashland,Ky.(8) | A10 | 4.675 |
| Cleveland | J5, R2 | 4.675 |
| Conshohocken,Pa. | A3 | 4.725 |
| Detroit(8) | M1 | 4.775 |
| Dravosburg,Pa. | U5 | 4.675 |
| Ecorse,Mich. | G5 | 4.775 |
| Fairfield,Ala. | T2 | 4.675 |
| Fairless,Pa. | U5 | 4.725 |
| Fontana,Calif. | K1 | 5.475 |
| Gary,Ind. | U5 | 4.675 |
| Geneva,Utah | C11 | 4.775 |
| GraniteCity,Ill.(8) | G4 | 4.875 |
| Ind.Harbor,Ind. | I-2, Y1 | 4.675 |
| Lackawanna,N.Y. | B2 | 4.675 |
| Munhall,Pa. | U5 | 4.675 |
| Newport,Ky.(8) | N9 | 4.675 |
| Niles,O. | M21 | 4.675 |
| Pittsburg,Calif. | C11 | 5.375 |
| Pittsburgh | J5 | 4.675 |
| Portsmouth,O. | P12 | 4.675 |
| Riverdale,Ill. | A1 | 4.675 |
| Sharon,Pa. | S3 | 4.675 |
| S.Chicago,Ill. | W14 | 4.675 |
| SparrowsPoint,Md. | B2 | 4.675 |
| Steubenville,O. | W10 | 4.675 |
| Warren,O. | R2 | 4.675 |
| Weirton,W.Va. | W6 | 4.675 |
| Youngstown | U5, Y1 | 4.675 |

### SHEETS, H.R., (19 Ga. & Lighter)

| | | |
|---|---|---|
| Niles,O. | M21 | 5.75 |

### SHEETS, H.R. Alloy

| | | |
|---|---|---|
| Dravosburg,Pa. | U5 | 7.75 |
| Gary,Ind. | U5 | 7.75 |
| Ind.Harbor,Ind. | Y1 | 7.75 |
| Newport,Ky. | N9 | 7.75 |
| Youngstown | Y1, U5 | 7.75 |

### SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

| | | |
|---|---|---|
| Cleveland | J5, R2 | 6.90 |
| Conshohocken,Pa. | A3 | 6.95 |
| Dravosburg,Pa. | U5 | 6.90 |
| Ecorse,Mich. | G5 | 7.00 |
| Fairfield,Ala. | T2 | 6.90 |
| Fairless,Pa. | U5 | 6.95 |
| Fontana,Calif. | K1 | 7.70 |
| Gary,Ind. | U5 | 6.90 |
| Ind.Harbor,Ind. | I-2, Y1 | 6.90 |
| Lackawanna(35) | B2 | 6.90 |
| Munhall,Pa. | U5 | 6.90 |
| Pittsburgh | J5 | 6.90 |
| S.Chicago,Ill. | U5 | 6.90 |
| SparrowsPoint(36) | B2 | 6.90 |
| Warren,O. | R2 | 6.90 |
| Weirton,W.Va. | W6 | 6.90 |
| Youngstown | U5, Y1 | 6.90 |

### SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

| | | |
|---|---|---|
| Ashland,Ky.(8) | A10 | 4.925 |
| Cleveland | R2 | 5.425 |
| Ind.Harbor,Ind. | I-2 | 4.925 |
| Warren,O. | R2 | 5.425 |

### SHEETS, Cold-Rolled Steel (Commercial Quality)

| | | |
|---|---|---|
| Allenport,Pa. | P7 | 5.75 |
| Cleveland | J5, R2 | 5.75 |
| Conshohocken,Pa. | A3 | 5.80 |
| Dravosburg,Pa. | U5 | 5.75 |
| Detroit | M1 | 5.75 |
| Ecorse,Mich. | G5 | 5.85 |
| Fairfield,Ala. | T2 | 5.75 |
| Fairless,Pa. | U5 | 5.80 |
| Follansbee,W.Va. | F4 | 5.75 |
| Fontana,Calif. | K1 | 6.95 |
| Gary,Ind. | U5 | 5.75 |
| GraniteCity,Ill. | G4 | 5.95 |
| Ind.Harbor,Ind. | I-2, Y1 | 5.75 |
| Lackawanna,N.Y. | B2 | 5.75 |
| Mansfield,O. | E6 | 5.75 |
| Middletown,O. | A10 | 5.75 |
| Newport,Ky. | N9 | 5.75 |
| Pittsburg,Calif. | C11 | 6.70 |
| Pittsburgh | J5 | 5.75 |
| Portsmouth,O. | P12 | 5.75 |
| SparrowsPoint,Md. | B2 | 5.75 |
| Steubenville,O. | W10 | 5.75 |
| Warren,O. | R2 | 5.75 |
| Weirton,W.Va. | W6 | 5.75 |
| Youngstown | Y1 | 5.75 |

### SHEETS, Cold-Rolled High-Strength, Low-Alloy

| | | |
|---|---|---|
| Cleveland | J5, R2 | 8.525 |
| Dravosburg,Pa. | U5 | 8.525 |
| Ecorse,Mich. | G5 | 8.625 |
| Fairless,Pa. | U5 | 8.575 |
| Fontana,Calif. | K1 | 9.725 |
| Gary,Ind. | U5 | 8.525 |
| IndianaHarbor,Ind. | Y1 | 8.525 |
| Lackawanna(37) | B2 | 8.525 |
| Pittsburgh | J5 | 8.525 |
| SparrowsPoint(38) | B2 | 8.525 |
| Warren,O. | R2 | 8.525 |
| Weirton,W.Va. | W6 | 8.525 |
| Youngstown | Y1 | 8.525 |

### SHEETS, Cold-Rolled Ingot Iron

| | | |
|---|---|---|
| Cleveland | R2 | 6.50 |
| Middletown,O. | A10 | 6.25 |
| Warren,O. | R2 | 6.50 |

### SHEETS, Culvert

| | | Cu Steel | Cu Fe |
|---|---|---|---|
| Ashland,Ky. | A10 | 6.65 | 6.90 |
| Canton,O. | R2 | 6.65 | 7.15 |
| Dravosburg | U5 | 6.65 | 6.90 |
| Fairfield | T2 | 6.65 | 6.90 |
| Gary,Ind. | U5 | 6.65 | 6.90 |
| GraniteCity,Ill. | G4 | 6.85 | ... |
| Ind.Harbor | I-2 | 6.65 | 6.90 |
| Kokomo,Ind. | C16 | 6.75 | ... |
| MartinsFry. | W10 | 6.65 | ... |
| Pitts.,Calif. | C11 | 7.40 | ... |
| SparrowsPt. | B2 | 6.65 | ... |

### SHEETS, Culvert—Pure Iron

| | | |
|---|---|---|
| Dravosburg,Pa. | U5 | 6.90 |
| Gary,Ind. | U5 | 6.90 |
| Ind.Harbor,Ind. | I-2 | 6.90 |
| MartinsFry.,O. | W10 | 6.90 |

### SHEETS, Galvanized Steel Hot-Dipped

| | | |
|---|---|---|
| Ala.City,Ala. | R2 | 6.30‡ |
| Ashland,Ky. | A10 | 6.30† |
| Canton,O. | R2 | 6.30‡ |
| Dover,O. | R1 | 6.30† |
| Dravosburg,Pa. | U5 | 6.30† |
| Fairfield,Ala. | T2 | 6.30† |
| Gary,Ind. | U5 | 6.30† |
| Granite City,Ill. | G4 | 6.50* |
| Ind.Harbor,Ind. | I-2 | 6.30† |
| Kokomo,Ind. | C16 | 6.40‡ |
| MartinsFerry,O. | W10 | 6.30* |
| Middletown,O. | A10 | 6.30† |
| Pittsburg,Calif. | C11 | 7.05* |
| Pittsburgh | J5 | 6.30† |
| SparrowsPt.,Md. | B2 | 6.30† |
| Warren,O. | R2 | 6.30† |
| Weirton,W.Va. | W6 | 6.30* |

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

### SHEETS, Well Casing

| | | |
|---|---|---|
| Fontana,Calif. | K1 | 6.975 |

### SHEETS, Galvanized High-Strength Low-Alloy

| | | |
|---|---|---|
| Dravosburg,Pa. | U5 | 9.275 |
| SparrowsPoint(39) | B2 | 9.275 |

### SHEETS, Galvannealed Steel

| | | |
|---|---|---|
| Canton,O. | R2 | 6.70 |
| Dravosburg,Pa. | U5 | 6.70 |
| Kokomo,Ind. | C16 | 7.00 |

### SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

| | | |
|---|---|---|
| Ashland,Ky. | A10 | 6.55 |
| Middletown,O. | A10 | 6.55 |

### SHEETS, Electrogalvanized

| | | |
|---|---|---|
| Cleveland(28) | R2 | 7.125 |
| Niles,O.(28) | R2 | 7.125 |
| Weirton,W.Va. | W6 | 6.975 |

### SHEETS, Aluminum Coated

| | | |
|---|---|---|
| Butler,Pa. | A10 (type 1) | 8.95 |
| Butler,Pa. | A10 (type 2) | 9.05 |

### SHEETS, Enameling Iron

| | | |
|---|---|---|
| Ashland,Ky. | A10 | 6.325 |
| Cleveland | R2 | 6.325 |
| Dravosburg,Pa. | U5 | 6.325 |
| Gary,Ind. | U5 | 6.325 |
| GraniteCity,Ill. | G4 | 6.525 |
| Ind.Harbor,Ind. | I-2, Y1 | 6.325 |
| Middletown,O. | A10 | 6.325 |
| Niles,O. | M21 | 6.325 |
| Youngstown | Y1 | 6.325 |

### BLUED STOCK, 29 Gage

| | | |
|---|---|---|
| Follansbee,W.Va. | F4 | 8.35 |
| Ind.Harbor,Ind. | I-2 | 8.175 |
| Yorkville,O. | W10 | 8.175 |

### SHEETS, Long Terne Steel (Commercial Quality)

| | | |
|---|---|---|
| BeechBottom,W.Va. | W10 | 6.70 |
| Gary,Ind. | U5 | 6.70 |
| Mansfield,O. | E6 | 6.70 |
| Middletown,O. | A10 | 6.70 |
| Niles,O. | M21 | 6.70 |
| Weirton,W.Va. | W6 | 6.70 |

### SHEETS, Long Terne, Ingot Iron

| | | |
|---|---|---|
| Middletown,O. | A10 | 7.10 |

## Key To Producers

| | |
|---|---|
| A1 | Acme Steel Co. |
| A3 | Alan Wood Steel Co. |
| A4 | Allegheny Ludlum Steel |
| A5 | Alloy Metal Wire Div., H. K. Porter Co. Inc. |
| A6 | American Shim Steel Co. |
| A7 | American Steel & Wire Div., U. S. Steel Corp. |
| A8 | Anchor Drawn Steel Co. |
| A9 | Angell Nail & Chaplet |
| A10 | Armco Steel Corp. |
| A11 | Atlantic Steel Co. |
| B1 | Babcock & Wilcox Co. |
| B2 | Bethlehem Steel Co. |
| B3 | Beth. Pac. Coast Steel |
| B4 | Blair Strip Steel Co. |
| B5 | Bliss & Laughlin Inc. |
| B8 | Braeburn Alloy Steel |
| B9 | Brainard Steel Div., Sharon Steel Corp. |
| B10 | E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron |
| B11 | Buffalo Bolt Co., Div., Buffalo-Eclipse Corp. |
| B12 | Buffalo Steel Corp. |
| B14 | A. M. Byers Co. |
| B15 | J. Bishop & Co. |
| C1 | Calstrip Steel Corp. |
| C2 | Calumet Steel Div. Borg-Warner Corp. |
| C4 | Carpenter Steel Co. |
| C7 | Cleve. Cold Rolling Mills |
| C8 | Cold Metal Products Co. |
| C9 | Colonial Steel Co. |
| C10 | Colorado Fuel & Iron |
| C11 | Columbia-Geneva Steel |
| C12 | Columbia Steel & Shaft. |
| C13 | Columbia Tool Steel Co. |
| C14 | Compressed Steel Shaft. |
| C15 | Connors Steel Div. H. K. Porter Co. Inc. |
| C16 | Continental Steel Corp. |
| C17 | Copperweld Steel Co. |
| C18 | Crucible Steel Co. |
| C19 | Cumberland Steel Co. |
| C20 | Cuyahoga Steel & Wire |
| C22 | Claymont Steel Products Dept. Wickwire Spencer Steel Division |
| C23 | Charter Wire Inc. |
| C24 | G. O. Carlson Inc. |
| D2 | Detroit Steel Corp. |
| D3 | Dearborn Division Sharon Steel Corp. |
| D4 | Disston & Sons, Henry |
| D6 | Driver-Harris Co. |
| D7 | Dickson Weatherproof Nail Co. |
| D8 | Damascus Tube Co. |
| D9 | Wilbur B. Driver Co. |
| E1 | EasternGas&FuelAssoc. |
| E2 | Eastern Stainless Steel |
| E4 | Electro Metallurgical Co. |
| E5 | Elliott Bros. Steel Co. |
| E6 | Empire Steel Corp. |
| F2 | Firth Sterling Inc. |
| F3 | Fitzsimmons Steel Co. |
| F4 | Follansbee Steel Corp. |
| F5 | Franklin Steel Div. Borg-Warner Corp. |
| F6 | Fretz-Moon Tube Co. |
| F7 | Ft. Howard Steel & Wire |
| F8 | Ft. Wayne Metals Inc. |
| G4 | Granite City Steel Co. |
| G5 | Great Lakes Steel Corp. |
| G6 | Greer Steel Co. |
| H1 | Hanna Furnace Corp. |
| H7 | Helical Tube Co. |
| I-1 | Igoe Bros. Inc. |
| I-2 | Inland Steel Co. |
| I-3 | Interlake Iron Corp. |
| I-4 | Ingersoll Steel Div., Borg-Warner Corp. |
| I-6 | Ivins, E., Steel Tube |
| I-7 | Indiana Steel & Wire Co. |
| J1 | Jackson Iron & Steel Co. |
| J3 | Jessop Steel Co. |
| J4 | Johnson Steel & Wire Co. |
| J5 | Jones & Laughlin Steel |
| J6 | Joslyn Mfg. & Supply |
| J7 | Judson Steel Corp. |
| J8 | Jersey Shore Steel Co. |
| K1 | Kaiser Steel Corp. |
| K2 | Keokuk Electro-Metals |
| K3 | Keystone Drawn Steel |
| K4 | Keystone Steel & Wire |
| K7 | Kenmore Metals Corp. |
| L1 | Laclede Steel Co. |
| L2 | LaSalle Steel Co. |
| L3 | Latrobe Steel Co. |
| L5 | Lockhart Iron & Steel |
| L6 | Lone Star Steel Co. |
| L7 | Lukens Steel Co. |
| M1 | McLouth Steel Corp. |
| M4 | Mahoning Valley Steel |
| M6 | Mercer Pipe Div., Sawhill Tubular Products |
| M8 | Mid-States Steel & Wire |
| M12 | Moltrup Steel Products |
| M13 | Monarch Steel Div., Jones & Laughlin Steel Corp. |
| M14 | McInnes Steel Co. |
| M16 | Md. Fine&Special. Wire |
| M17 | Metal Forming Corp. |
| M18 | Milton Steel Division, Merritt-Chapman&Scott |
| M21 | Mallory-Sharon Titanium Corp. |
| N1 | National Standard Co. |
| N2 | National Supply Co. |
| N3 | National Tube Div., U. S. Steel Corp. |
| N5 | Nelsen Steel & Wire Co. |
| N6 | New England High Carbon Wire Co. |
| N8 | Newman-Crosby Steel |
| N9 | Newport Steel Corp. |
| N14 | Northwest.SteelRoll.Mill |
| N15 | Northwestern S.&W. Co. |
| N16 | New Delphos Mfg. Co. |
| N19 | Northeastern Steel Corp. |
| O3 | Oliver Iron & Steel Corp. |
| O4 | Oregon Steel Mills |
| P1 | PacificStatesSteelCorp. |
| P2 | Pacific Tube Co. |
| P4 | Phoenix Iron & Steel Co. Sub. of Barium Steel Corp. |
| P5 | Pilgrim Drawn Steel |
| P6 | Pittsburgh Coke&Chem. |
| P7 | Pittsburgh Steel Co. |
| P11 | Pollak Steel Co. |
| P12 | Portsmouth Division, Detroit Steel Corp. |
| P13 | Precision Drawn Steel |
| P14 | Pitts. Screw & Bolt Co. |
| P15 | Pittsburgh Metallurgical |
| P16 | Page Steel & Wire Div., Amer. Chain & Cable |
| P17 | Plymouth Steel Co. |
| P19 | Pitts. Rolling Mills |
| P20 | Prod. Steel Strip Corp. |
| P22 | Phoenix Mfg. Co. |
| R1 | Reeves Steel & Mfg. Co. |
| R2 | Republic Steel Corp. |
| R3 | Rhode Island Steel Corp. |
| R5 | Roebling's Sons, John A. |
| R6 | Rome Strip Steel Co. |
| R7 | Rotary Electric Steel Co. |
| R8 | Reliance Div.,EatonMfg. |
| R9 | Rome Mfg. Co. |
| R10 | Rodney Metals Inc. |
| S1 | Seneca Wire & Mfg. Co. |
| S3 | Sharon Steel Corp. |
| S4 | Sharon Tube Co. |
| S5 | Sheffield Steel Div., Armco Steel Corp. |
| S6 | Shenango Furnace Co. |
| S7 | Simmons Co. |
| S8 | Simonds Saw & Steel Co. |
| S12 | Spencer Wire Corp. |
| S13 | Standard Forgings Corp. |
| S14 | Standard Tube Co. |
| S15 | Stanley Works |
| S17 | Superior Drawn Steel Co. |
| S18 | Superior Steel Corp. |
| S19 | Sweet's Steel Co. |
| S20 | Southern States Steel |
| S23 | Superior Tube Co. |
| S25 | Stainless Welded Prod. |
| S26 | Specialty Wire Co. Inc. |
| S30 | Sierra Drawn Steel Corp. |
| S40 | Seneca Steel Service |
| T2 | Tenn.Coal & Iron Div., U. S. Steel Corp. |
| T3 | Tenn. Prod & Chem. |
| T4 | Texas Steel Co. |
| T5 | Thomas Strip Division, Pittsburgh Steel Co. |
| T6 | Thompson Wire Co. |
| T7 | Timken Roller Bearing |
| T9 | Tonawanda Iron Div. Am. Rad. & Stan. San. |
| T13 | Tube Methods Inc. |
| T19 | Techalloy Co. Inc. |
| U4 | Universal-Cyclops Steel |
| U5 | United States Steel Corp. |
| U6 | U. S. Pipe & Foundry |
| U7 | Ulbrich Stainless Steels |
| U8 | U. S. Steel Supply Div. U. S. Steel Corp. |
| V2 | Vanadium-Alloys Steel |
| V3 | Vulcan Crucible Div., H. K. Porter Co. Inc. |
| W1 | Wallace Barnes Co. |
| W2 | Wallingford Steel Co. |
| W3 | Washburn Wire Co. |
| W4 | Washington Steel Corp. |
| W6 | Weirton Steel Co. |
| W7 | W.Va. Steel & Mfg. Co. |
| W8 | Western Automatic Machine Screw Co. |
| W9 | Wheatland Tube Co. |
| W10 | Wheeling Steel Corp. |
| W12 | Wickwire Spencer Steel Div., Colo. Fuel & Iron |
| W13 | Wilson Steel & Wire Co. |
| W14 | Wisconsin Steel Div., International Harvester |
| W15 | Woodward Iron Co. |
| W18 | Wyckoff Steel Co. |
| W19 | Worcester Pressed Steel |
| Y1 | Youngstown Sheet&Tube |

## STRIP

### STRIP, Hot-Rolled Carbon

| | |
|---|---|
| Ala.City,Ala.(27) R2 | 4.675 |
| Allenport,Pa. P7 | 4.675 |
| Alton,Ill. L1 | 4.875 |
| Ashland,Ky.(8) A10 | 4.675 |
| Atlanta A11 | 4.875 |
| Bessemer,Ala. T2 | 4.675 |
| Birmingham C15 | 4.975 |
| Bridgeport,Conn. N19 | 4.625 |
| Buffalo(27) R2 | 4.675 |
| Conshohocken,Pa. A3 | 4.725 |
| Detroit M1 | 4.775 |
| Ecorse,Mich. G5 | 4.775 |
| Fairfield,Ala. T2 | 4.675 |
| Fontana,Calif. K1 | 5.475 |
| Gary,Ind. U5 | 4.675 |
| Houston S5 | 4.925 |
| Ind.Harbor,Ind. I-2, Y1 | 4.675 |
| Johnstown,Pa.(25) B2 | 4.675 |
| KansasCity,Mo. S5 | 4.925 |
| Lackaw'na,N.Y.(25) B2 | 4.675 |
| LosAngeles(25) B3 | 5.425 |
| Minnequa,Colo. C10 | 5.775 |
| Pittsburg,Calif. C11 | 5.425 |
| Riverdale,Ill. A1 | 4.675 |
| SanFrancisco S7 | 5.95 |
| Seattle(25) B3 | 5.675 |
| Seattle N14 | 5.675 |
| Sharon,Pa. S3 | 4.675 |
| S.Chicago,Ill. W14 | 4.675 |
| S.SanFrancisco(25) B3 | 5.425 |
| SparrowsPoint,Md. B2 | 4.675 |
| Sterling,Ill.(1) N15 | 4.675 |
| Sterling,Ill. N15 | 4.775 |
| Torrance,Calif. C11 | 5.425 |
| Warren,O. R2 | 4.675 |
| Weirton,W.Va. W6 | 4.675 |
| Youngstown U5 | 4.675 |

### STRIP, Hot-Rolled Alloy

| | |
|---|---|
| Bridgeport,Conn. N19 | 7.50 |
| Carnegie,Pa. S18 | 7.75 |
| Dravosburg,Pa. U5 | 7.75 |
| Gary,Ind. U5 | 7.75 |
| Ind.Harbor,Ind. Y1 | 7.75 |
| LosAngeles B3 | 8.95 |
| Newport,Ky. N9 | 7.75 |
| Sharon,Pa. S3 | 7.75 |
| S.Chicago,Ill. W14 | 7.75 |
| Youngstown U5, Y1 | 7.75 |

### STRIP, Hot-Rolled High-Strength, Low-Alloy

| | |
|---|---|
| Bessemer,Ala. T2 | 6.95 |
| Conshohocken,Pa. A3 | 6.95 |
| Ecorse,Mich. G5 | 7.05 |
| Fairfield,Ala. T2 | 6.95 |
| Gary,Ind. U5 | 6.95 |
| Houston S5 | 7.20 |
| Ind.Harbor,Ind. I-2, Y1 | 6.95 |
| KansasCity,Mo. S5 | 7.20 |
| Lackawanna,N.Y. B2 | 6.95 |
| LosAngeles(25) B3 | 7.70 |
| Seattle(25) B3 | 7.95 |
| Sharon,Pa. S3 | 6.95 |
| S.SanFrancisco(25) B3 | 7.70 |
| SparrowsPoint,Md. B2 | 6.95 |
| Warren O. R2 | 6.95 |
| Weirton,W.Va. W6 | 6.95 |
| Youngstown U5, Y1 | 6.95 |

### STRIP, Hot-Rolled Ingot Iron

| | |
|---|---|
| Ashland,Ky.(8) A10 | 4.925 |
| Warren,O. R2 | 5.425 |

### STRIP, Cold-Rolled Carbon

| | |
|---|---|
| Anderson,Ind. G6 | 6.85 |
| Baltimore T6 | 6.85 |
| Boston T6 | 7.40 |
| Buffalo S40 | 6.85 |
| Cleveland A7, J5 | 6.85 |
| Conshohocken,Pa. A3 | 6.90 |
| Dearborn,Mich. D3 | 6.95 |
| Detroit D2, M1, P20 | 6.95 |
| Dover,O. G6 | 6.85 |
| Ecorse,Mich. G5 | 6.95 |
| Follansbee,W.Va. F4 | 6.85 |
| Fontana,Calif. K1 | 8.60 |
| FranklinPark,Ill. T6 | 6.95 |
| Ind.Harbor,Ind. Y1 | 6.85 |
| Indianapolis C8 | 7.00 |
| LosAngeles C1 | 8.80 |
| NewBedford Mass. R10 | 7.30 |
| NewBritain(10) S15 | 6.85 |
| NewCastle,Pa. B4, E5 | 6.85 |
| NewHaven,Conn. D2 | 7.30 |
| NewKensington,Pa. A6 | 6.85 |
| Pawtucket,R.I. R3 | 7.50 |
| Pawtucket,R.I. N8 | 7.40 |
| Pittsburgh J5 | 6.85 |
| Riverdale,Ill. A1 | 6.95 |
| Rome,N.Y.(32) R6 | 6.85 |
| Sharon,Pa. S3 | 6.85 |
| Trenton,N.J.(31) R5 | 8.30 |
| Wallingford,Conn. W2 | 7.30 |
| Warren,O. R2, T5 | 6.85 |
| Weirton,W.Va. W6 | 6.85 |
| Worcester,Mass. A7 | 7.40 |
| Youngstown C8, Y1 | 6.85 |

### STRIP, Cold-Rolled Alloy

| | |
|---|---|
| Boston T6 | 14.90 |
| Carnegie,Pa. S18 | 14.55 |
| Cleveland A7 | 14.55 |
| Dover,O. G6 | 14.55 |
| FranklinPark,Ill. T6 | 14.55 |
| Harrison,N.J. C18 | 14.55 |
| Indianapolis C8 | 14.70 |
| Pawtucket,R.I. N8 | 14.90 |
| Sharon,Pa. S3 | 14.55 |
| Worcester,Mass. A7 | 14.85 |
| Youngstown C8 | 14.55 |

### STRIP, Cold-Rolled High-Strength, Low-Alloy

| | |
|---|---|
| Cleveland A7 | 10.00 |
| Dearborn,Mich. D3 | 10.10 |
| Dover,O. G6 | 10.10 |
| Ecorse,Mich. G5 | 10.10 |
| Ind.Harbor,Ind. Y1 | 10.20 |
| Sharon,Pa. S3 | 10.00 |
| Warren,O. R2 | 10.00 |
| Weirton,W.Va. W6 | 10.20 |
| Youngstown Y1 | 10.20 |

### STRIP, Cold-Rolled Ingot Iron

| | |
|---|---|
| Warren,O. R2 | 7.60 |

### STRIP, Electrogalvanized

| | |
|---|---|
| Cleveland A7 | 6.85* |
| Dover,O. G6 | 6.85* |
| Riverdale,Ill. A1 | 6.95* |
| Warren,O. B9, T5 | 6.85* |
| Worcester,Mass. A7 | 7.40* |
| Youngstown C8 | 6.85* |

*Plus galvanizing extras.

### STRIP, Galvanized (Continuous)

| | |
|---|---|
| Sharon,Pa. S3 | 6.975 |

### TIGHT COOPERAGE HOOP

| | |
|---|---|
| Atlanta A11 | 5.40 |
| Riverdale,Ill. A1 | 5.25 |
| Sharon,Pa. S3 | 5.10 |
| Youngstown U5 | 5.10 |

### STRIP, Cold-Finished Spring Steel (Annealed)

| | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Baltimore T6 | 8.50 | 10.10 | 12.90 | 15.30 | 18.25 |
| Boston T6 | 8.50 | 10.10 | 12.90 | 15.30 | 18.25 |
| Bristol,Conn. W1 | ... | ... | 12.90 | 15.30 | 18.25 |
| Carnegie,Pa. S18 | ... | 9.80 | 12.60 | 15.00 | .... |
| Cleveland A7 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Cleveland C7 | ... | 9.80 | 12.60 | 15.00 | 17.95 |
| Dover,O. G6 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Detroit D2 | 8.05 | 9.90 | 12.70 | 15.10 | .... |
| Dearborn,Mich. D3 | 8.05 | 9.90 | 12.70 | .... | .... |
| FranklinPark,Ill. T6 | 8.05 | 9.80 | 12.60 | 15.00 | 17.95 |
| Harrison,N.J. C18 | ... | ... | 12.90 | 15.30 | 18.25 |
| Indianapolis C8 | 8.10 | 9.95 | 12.60 | 15.00 | 17.95 |
| NewBritain,Conn.(10) S15 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| NewCastle,Pa. B4, E5 | 7.95 | 9.80 | 12.60 | 15.00 | .... |
| NewHaven,Conn. D2 | 8.40 | 10.10 | 12.90 | 15.30 | .... |
| NewKensington,Pa. A6 | 7.95 | 9.80 | 12.60 | 15.00 | .... |
| NewYork W3 | ... | 10.10 | 12.90 | 15.30 | 18.25 |
| Pawtucket,R.I. N8 | 8.50 | 10.10 | 12.90 | 15.30 | 18.25 |
| Riverdale,Ill. A1 | 8.05 | 9.80 | 12.60 | 15.00 | 17.95 |
| Rome,N.Y.(32) R6 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Sharon,Pa. S3 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Trenton,N.J. R5 | ... | 10.10 | 12.90 | 15.30 | 18.25 |
| Wallingford,Conn. W2 | 8.40 | 10.10 | 12.90 | 15.30 | 18.15 |
| Warren,O. T5 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Weirton,W.Va. W6 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Worcester,Mass. A7, T6 | 8.50 | 10.10 | 12.90 | 15.30 | 18.25 |
| Youngstown C8 | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |

### Spring Steel (Tempered)

| | | | Up to 0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Bristol,Conn. W1 | ... | ... | 16.80 | 20.65 | .... |
| Buffalo W12 | ... | ... | 16.80 | .... | .... |
| FranklinPark,Ill. T6 | ... | ... | 17.15 | 21.00 | 25.35 |
| Harrison,N.J. C18 | ... | ... | 16.80 | 20.65 | 25.00 |
| NewYork W3 | ... | ... | 16.80 | 20.65 | 25.00 |
| Palmer,Mass. W12 | ... | ... | 16.80 | .... | .... |
| Trenton,N.J. R5 | ... | ... | 16.80 | 20.65 | 25.00 |
| Worcester,Mass. W12 | ... | ... | 14.80 | .... | .... |
| Worcester,Mass. A7, T6 | ... | ... | 16.80 | 20.65 | 25.00 |
| Youngstown C8 | ... | ... | 17.15 | 21.00 | 25.35 |

## SILICON STEEL

| H.R. SHEETS (22 Ga., cut lengths) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| BeechBottom W.Va. W10 | ... | ... | 11.00 | 12.05 | 13.05 |
| Brackenridge,Pa. A4 | ... | ... | 11.00 | 12.05 | 13.05 |
| Mansfield,O. E6 | 9.20 | 10.35 | 11.00 | 12.05 | 13.05 |
| Newport,Ky. N9 | 9.20 | 10.35 | 11.00 | 12.05 | 13.05 |
| Niles,O. M21 | 9.20 | 10.35 | 11.00 | 12.05 | .... |
| Vandergrift,Pa. U5 | ... | 10.35 | 11.00 | 12.05 | 13.05 |
| Warren,O. R2 | 9.20 | 10.35 | 11.00 | 12.05 | .... |
| Zanesville,O. A10 | ... | 10.35 | 11.00 | 12.05 | 13.05 |
| Zanesville,O. A10 (FP coils) | ... | 10.85 | 11.525 | 12.575 | 13.55 |
| Zanesville,O. A10 (SP coils) | ... | .... | 11.025 | 12.075 | 13.05 |

| C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| Brackenridge,Pa. A4 | ... | .... | 11.525 | 12.575 | 13.55 |
| GraniteCity,Ill. G4 | 9.40* | 10.55* | 11.225* | 12.275* | .... |
| IndianaHarbor,Ind. I-2 | 9.20† | 10.35* | 11.025* | 12.075* | .... |
| Mansfield,O. E6 | 9.70 | 10.85 | 11.525 | 12.575 | 13.55 |
| Vandergrift,Pa. U5 | 9.20* | 10.35* | 11.025* | 12.075* | 13.05* |
| Vandergrift,Pa. U5 | ... | 10.85† | 11.525† | 12.575† | 13.55† |
| Warren,O. R2 | 9.20* | 10.85 | 11.525 | 12.575 | 13.55 |

| H.R. SHEETS (22 Ga., cut lengths) | Transformer Grade T-72 | T-65 | T-58 | T-52 |
|---|---|---|---|---|
| BeechBottom,W.Va. W10 | 14.05 | 14.60 | 15.10 | 16.15 |
| Brackenridge,Pa. A4 | 14.05 | .... | .... | .... |
| Vandergrift,Pa. U5 | 14.05 | 14.60 | 15.10 | 16.15 |
| Zanesville,O. A10 | 14.05 | 14.60 | 15.10 | 16.15 |

| C.R. COILS & CUT LENGTHS (22 Ga.) | Grain Oriented T-100 | T-90 | T-80 | T-73 | T-66 | T-72 |
|---|---|---|---|---|---|---|
| Brackenridge Pa. A4 | .... | 16.90 | 18.50 | 19.00 | 19.50 | 14.05** |
| Butler,Pa. A10 | .... | .... | 18.50 | 19.00 | 19.50 | .... |
| Vandergrift,Pa. U5 | 15.90 | 16.90 | 18.50 | 19.00 | 19.50 | 14.55** |
| Warren,O. R2 | .... | .... | .... | .... | .... | 14.55‡ |

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

## TIN MILL PRODUCTS

| TIN PLATE Electrolytic (Base Box) | 0.25 lb | 0.50 lb | 0.75 lb |
|---|---|---|---|
| *Aliquippa,Pa. J5* | *$8.40* | *$8.65* | *$9.05* |
| *Dravosburg,Pa. U5* | *8.40* | *8.65* | *9.05* |
| *Fairfield,Ala. T2* | *8.50* | *8.75* | *9.15* |
| *Fairless,Pa. U5* | *8.50* | *8.75* | *9.15* |
| *Fontana,Calif. K1* | *9.15* | *9.40* | *9.80* |
| *Gary,Ind. U5* | *8.40* | *8.65* | *9.05* |
| *GraniteCity,Ill. G4* | *8.50* | *9.75* | *9.15* |
| *IndianaHarbor,Ind. I-2, Y1* | *8.40* | *8.65* | *9.05* |
| *Niles,O. R2* | *8.40* | *8.65* | *9.05* |
| *Pittsburg,Calif. C11* | *9.15* | *9.40* | *9.80* |
| *SparrowsPoint,Md. B2* | *8.50* | *8.75* | *9.15* |
| *Weirton,W.Va. W6* | *8.40* | *8.65* | *9.05* |
| *Yorkville,O. W10* | *8.40* | *8.65* | *9.05* |

| ELECTROTIN (22-27 Gage; Dollars per 100 lb) | | | |
|---|---|---|---|
| Aliquippa,Pa. J5 | 6.975 | .... | .... |
| Niles,O. R2 | 7.425 | 7.625 | 7.825 |

| TINPLATE, American | 1.25 lb | 1.50 lb |
|---|---|---|
| Aliquippa,Pa. J5 | $9.60 | $9.85 |
| *Dravosburg,Pa. U5* | *9.70* | *9.95* |
| *Fairfield,Ala. T2* | *9.80* | *10.05* |
| *Fairless,Pa. U5* | *9.80* | *10.05* |
| *Fontana,Calif. K1* | *10.45* | *10.70* |
| *Gary,Ind. U5* | *9.70* | *9.95* |
| *Ind.Harbor Y1* | *9.70* | *9.95* |
| *Pitts.,Calif. C11* | *10.45* | *10.70* |
| *Sp.Pt.,Md. B2* | *9.80* | *10.05* |
| *Weirton,W.Va. W6* | *9.70* | *9.95* |
| *Yorkville,O. W10* | *9.70* | *9.95* |

| BLACK PLATE (Base Box) | |
|---|---|
| *Aliquippa,Pa. J5* | *$7.50* |
| *Dravosburg,Pa. U5* | *7.50* |
| *Fairfield,Ala. T2* | *7.60* |
| *Fairless,Pa. U5* | *7.60* |
| *Fontana,Calif. K1* | *8.25* |
| *Gary,Ind. U5* | *7.50* |
| *GraniteCity,Ill. G4* | *7.60* |
| *Ind.Harbor,Ind. I-2, Y1* | *7.50* |
| *Niles,O. R2* | *7.50* |
| *Pittsburg,Calif. C11* | *8.25* |
| *SparrowsPoint,Md. B2* | *7.60* |
| *Weirton,W.Va. W6* | *7.50* |
| *Yorkville,O. W10* | *7.50* |

### HOLLOWARE ENAMELING

Black Plate (29 Gage)

| | |
|---|---|
| Dravosburg,Pa. U5 | $7.15 |
| Gary,Ind. U5 | 7.15 |
| GraniteCity,Ill. G4 | 7.25 |
| Ind.Harbor,Ind. Y1 | 7.15 |
| Yorkville,O. W10 | 7.15 |

### MANUFACTURING TERNES

(Special Coated; Base Box)

| | |
|---|---|
| *Dravosburg,Pa. U5* | *$9.20* |
| *Gary,Ind. U5* | *9.20* |

### ROOFING SHORT TERNES

(8 lb Coated; Base Box)

| | |
|---|---|
| *Gary,Ind. U5* | *$10.75* |

## WIRE

### WIRE, Manufacturers Bright, Low Carbon

| | |
|---|---|
| AlabamaCity,Ala. R2 | 7.20 |
| Aliquippa,Pa. J5 | 7.20 |
| Alton,Ill. L1 | 7.40 |
| Atlanta A11 | 7.40 |
| Bartonville,Ill. K4 | 7.30 |
| Buffalo W12 | 7.20 |
| Chicago W13 | 7.20 |
| Cleveland A7, C20 | 7.20 |
| Crawfordsville,Ind. M8 | 7.30 |
| Donora,Pa. A7 | 7.20 |
| Duluth A7 | 7.20 |
| Fairfield,Ala. T2 | 7.20 |
| Fostoria,O.(24) S1 | 7.30 |
| Houston S5 | 7.45 |
| Jacksonville,Fla. M8 | 7.55 |
| Johnstown,Pa. B2 | 7.20 |
| Joliet,Ill. A7 | 7.20 |
| KansasCity,Mo. S5 | 7.45 |
| Kokomo,Ind. C16 | 7.30 |
| LosAngeles B3 | 8.15 |
| Minnequa,Colo. C10 | 7.45 |
| Monessen,Pa. P7, P16 | 7.20 |
| N.Tonawanda,N.Y. B11 | 7.20 |
| Palmer,Mass. W12 | 7.50 |
| Pittsburg,Calif. C11 | 8.15 |
| Portsmouth,O. P12 | 7.20 |
| Rankin,Pa. A7 | 7.20 |
| S.Chicago,Ill. R2 | 7.20 |
| S.SanFrancisco C10 | 8.15 |
| SparrowsPoint,Md. B2 | 7.30 |
| Sterling,Ill.(1) N15 | 7.20 |
| Sterling,Ill. N15 | 7.30 |
| Struthers,O. Y1 | 7.20 |
| Waukegan,Ill. A7 | 7.20 |
| Worcester,Mass. A7 | 7.50 |

### WIRE, Gal'd ACSR for Cores

| | |
|---|---|
| Bartonville,Ill. K4 | 11.75 |
| Buffalo W12 | 11.75 |
| Johnstown,Pa. B2 | 11.75 |
| Minnequa,Colo. C10 | 11.875 |
| Monessen,Pa. P16 | 11.75 |
| Muncie,Ind. I-7 | 11.95 |
| Palmer,Mass. W12 | 12.05 |
| Pittsburg,Calif. C11 | 12.55 |
| Portsmouth,O. P12 | 11.75 |
| Roebling,N.J. R5 | 12.05 |
| SparrowsPt.,Md. B2 | 11.85 |
| Struthers,O. Y1 | 11.75 |

| ROPE WIRE | (A) |
|---|---|
| Bartonville,Ill. K4 | 11.55 |
| Buffalo W12 | 11.55 |
| Fostoria,O. S1 | 11.55 |
| Johnstown,Pa. B2 | 11.55 |
| Monessen,Pa. P7, P16 | 11.55 |
| Muncie,Ind. I-7 | 11.75 |
| Palmer,Mass. W12 | 11.85 |
| Portsmouth,O. P12 | 11.35 |
| Roebling,N.J. R5 | 11.85 |
| SparrowsPt.,Md. B2 | 11.65 |
| Struthers,O. Y1 | 11.55 |
| Worcester,Mass. J4 | 11.85 |

(A) Plow and Mild Plow; add 0.25c for Improved Plow

### WIRE, Upholstery Spring

| | |
|---|---|
| Aliquippa,Pa. J5 | 8.40 |
| Alton,Ill. L1 | 8.60 |
| Buffalo W12 | 8.40 |
| Cleveland A7 | 8.40 |
| Donora,Pa. A7 | 8.40 |
| Duluth A7 | 8.40 |
| Johnstown,Pa. B2 | 8.40 |
| KansasCity,Mo. S5 | 8.65 |
| LosAngeles B3 | 9.35 |
| Minnequa,Colo. C10 | 8.60 |
| Monessen,Pa. P7, P16 | 8.40 |
| NewHaven,Conn. A7 | 8.70 |
| Palmer,Mass. W12 | 8.70 |
| Pittsburg,Calif. C11 | 9.35 |
| Portsmouth,O. P12 | 8.40 |
| Roebling,N.J. R5 | 8.70 |
| S.Chicago,Ill. R2 | 8.40 |
| S.SanFrancisco C10 | 9.35 |
| SparrowsPoint,Md. B2 | 8.50 |
| Struthers,O. Y1 | 8.40 |
| Trenton,N.J. A7 | 8.70 |
| Waukegan,Ill. A7 | 8.40 |
| Worcester,Mass. A7 | 8.70 |

### WIRE, MB Spring, High Carbon

| | |
|---|---|
| Aliquippa,Pa. J5 | 8.725 |
| Alton,Ill. L1 | 8.925 |
| Bartonville,Ill. K4 | 8.825 |
| Buffalo W12 | 8.725 |
| Cleveland A7 | 8.725 |
| Donora,Pa. A7 | 8.725 |
| Duluth A7 | 8.725 |
| Fostoria,O. S1 | 8.775 |
| Johnstown,Pa. B2 | 8.725 |
| LosAngeles B3 | 9.675 |
| Milbury,Mass.(12) N6 | 9.025 |
| Minnequa,Colo. C10 | 8.975 |
| Monessen,Pa. P7, P16 | 8.725 |
| Muncie,Ind. I-7 | 8.925 |
| Palmer,Mass. W12 | 9.025 |
| Pittsburg,Calif. C11 | 9.675 |
| Portsmouth,O. P12 | 8.725 |
| Roebling,N.J. R5 | 9.025 |
| S.Chicago,Ill. R2 | 8.725 |
| S.SanFrancisco C10 | 9.675 |
| SparrowsPt.,Md. B2 | 8.825 |
| Struthers,O. Y1 | 8.725 |
| Trenton,N.J. A7 | 9.025 |
| Waukegan,Ill. A7 | 8.725 |
| Worcester A7, J4, T6 | 9.025 |

### WIRE, Fine & Weaving (8" Coils)

| | |
|---|---|
| Alton,Ill. L1 | 14.35 |
| Bartonville,Ill. K4 | 14.25 |
| Buffalo W12 | 14.15 |
| Chicago W13 | 13.55 |
| Cleveland A7 | 14.15 |
| Crawfordsville,Ind. M8 | 14.25 |
| Fostoria,O. S1 | 14.15 |
| Jacksonville,Fla. M8 | 14.50 |
| Johnstown,Pa. B2 | 14.15 |
| Kokomo,Ind. C16 | 14.15 |
| Minnequa,Colo. C10 | 13.90 |
| Monessen,Pa. P6 | 14.15 |
| Muncie,Ind. I-7 | 14.35 |
| Palmer,Mass. W12 | 14.45 |
| Roebling,N.J. C10 | 14.45 |
| S.SanFrancisco C10 | 14.50 |
| Waukegan,Ill. A7 | 14.15 |
| Worcester,Mass. A7, T6 | 14.45 |

# WIRE

### WIRE, Tire Bead

| | |
|---|---|
| Bartonville,Ill. K4 | 15.25 |
| Monessen,Pa. P16 | 14.45 |
| Roebling,N.J. R5 | 14.35 |

### WIRE, Cold-Rolled Flat

| | |
|---|---|
| Anderson,Ind. G6 | 10.75 |
| Baltimore T6 | 11.05 |
| Boston T6 | 11.05 |
| Buffalo W12 | 10.75 |
| Cleveland A7 | 10.75 |
| Crawfordsville,Ind. M8 | 10.75 |
| Dover,O. G6 | 10.75 |
| Fostoria,O. S1 | 10.75 |
| FranklinPark,Ill. T6 | 10.85 |
| Kokomo,Ind. C16 | 10.75 |
| Massillon,O. R8 | 10.75 |
| Milwaukee C23 | 10.95 |
| Monessen,Pa. P7, P16 | 10.75 |
| NewKensington,Pa. A6 | 10.75 |
| Palmer,Mass. W12 | 11.05 |
| Pawtucket,R.I. N8 | 11.05 |
| Riverdale,Ill. A1 | 10.85 |
| Rome,N.Y. R6 | 10.75 |
| Trenton,N.J. R5 | 11.05 |
| Worcester,Mass. A7, T6 | 11.05 |

### NAILS, Stock

| | Col. |
|---|---|
| AlabamaCity, Ala. R2 | 164 |
| Aliquippa,Pa. (7) J5 | 167 |
| Atlanta A11 | 166 |
| Bartonville,Ill. (7) K4 | 169 |
| Chicago (7) W13 | 167 |
| Cleveland (7) A9 | 173 |
| Crawfordsville,Ind.(7)M8 | 169 |
| Donora,Pa. A7 | 164 |
| Duluth A7 | 164 |
| Fairfield,Ala. T2 | 164 |
| *Houston,Tex. S5* | *169* |
| Jack'ville,Fla.(7)(20)M8 | 178 |
| Johnstown,Pa. B2 | 164 |
| Joliet,Ill. A7 | 164 |
| *KansasCity,Mo. S5* | *169* |
| *Kokomo,Ind. C16* | *166* |
| Minnequa,Colo. (7) C10 | 172 |
| Monessen,Pa. (7) P7 | 167 |
| Pittsburg,Calif. C11 | 183 |
| Rankin,Pa. A7 | 164 |
| S.Chicago,Ill. R2 | 164 |
| SparrowsPt.,Md. B2 | 166 |
| Sterling,Ill.(1) N15 | 164 |
| Worcester,Mass. A7 | 170 |

(To Wholesalers; per cwt)

| | |
|---|---|
| Galveston,Tex. D7 | $8.75 |

### NAILS, Cut (100 lb keg) To Dealers (33)

| | |
|---|---|
| Conshohocken,Pa. A3 | $9.80 |
| Wheeling,W.Va. W10 | 9.80 |

### STAPLES, Polished Stock

| | Col. |
|---|---|
| AlabamaCity, Ala. R2 | 164 |
| Aliquippa,Pa. (7) J5 | 167 |
| Atlanta A11 | 166 |
| Bartonville,Ill. (7) K4 | 169 |
| Crawfordsville,Ind.(7)M8 | 169 |
| Donora,Pa. A7 | 164 |
| Duluth A7 | 164 |
| Fairfield,Ala. T2 | 164 |
| *Houston S5* | *169* |
| Jack'ville,Fla.(7)(20)M8 | 178 |
| Johnstown,Pa. B2 | 164 |
| Joliet,Ill. A7 | 164 |
| *KansasCity,Mo. S5* | *169* |
| *Kokomo,Ind. C16* | *166* |
| Minnequa,Colo. (7) C10 | 172 |
| Monessen,Pa. (7) P7 | 167 |
| Pittsburg,Calif. C11 | 183 |
| Rankin,Pa. A7 | 164 |
| S.Chicago,Ill. R2 | 164 |
| SparrowsPt.,Md. B2 | 166 |
| Sterling,Ill.(1) N15 | 164 |
| Worcester,Mass. A7 | 170 |

### TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150

| | |
|---|---|
| AlabamaCity,Ala. R2 | $9.53 |
| Atlanta A11 | 9.63 |
| Bartonville,Ill. K4 | 10.13 |
| Buffalo W12 | 10.05 |
| Crawfordsville,Ind. M8 | 10.13 |
| Donora,Pa. A7 | 9.53 |
| Duluth A7 | 9.53 |
| *Houston S5* | *9.78* |
| Jacksonville,Fla. M8 | 10.58 |
| Johnstown,Pa. B2 | 9.53 |
| Joliet,Ill. A7 | 9.53 |
| *KansasCity,Mo. S5* | *9.78* |
| *Kokomo,Ind. C16* | *9.63* |
| LosAngeles B3 | 10.32 |
| Minnequa,Colo. C10 | 10.28 |
| Pittsburg,Calif. C11 | 10.31 |
| S.Chicago,Ill. R2 | 9.53 |
| S.SanFrancisco C10 | 10.81 |
| SparrowsPt.,Md. B2 | 9.63 |
| Sterling,Ill.(1) N15 | 9.53 |

Coil No. 6500 Stand.

| | |
|---|---|
| AlabamaCity,Ala. R2 | $9.85 |
| Atlanta A11 | 9.95 |
| Bartonville,Ill. K4 | 10.45 |
| Buffalo W12 | 10.35 |
| Crawfordsville,Ind. M8 | 10.45 |
| Donora,Pa. A7 | 9.85 |
| Duluth A7 | 9.85 |
| *Houston S5* | *10.10* |
| *Kokomo,Ind. C16* | *9.95* |
| Jacksonville,Fla. M8 | 10.91 |
| Johnstown,Pa. B2 | 9.85 |
| Joliet,Ill. A7 | 9.85 |
| *KansasCity,Mo. S5* | *10.10* |
| Kokomo,Ind. C16 | 10.45 |
| LosAngeles B3 | 10.65 |
| Minnequa,Colo. C10 | 10.60 |
| Pittsburg,Calif. C11 | 10.65 |
| S.Chicago,Ill. R2 | 9.85 |
| S.SanFrancisco C10 | 11.15 |
| SparrowsPt.,Md. B2 | 9.95 |
| Sterling,Ill.(1) N15 | 9.85 |

Coil Interim

| | |
|---|---|
| AlabamaCity,Ala. R2 | $9.90 |
| Atlanta A11 | 10.00 |
| Bartonville,Ill. K4 | 10.50 |
| Buffalo W12 | 10.40 |
| Crawfordsville,Ind. M8 | 10.50 |
| Donora,Pa. A7 | 9.90 |
| Duluth A7 | 9.90 |
| *Houston S5* | *10.15* |
| Jacksonville,Fla. M8 | 10.96 |
| Johnstown,Pa. B2 | 9.90 |
| Joliet,Ill. A7 | 9.90 |
| *KansasCity,Mo. S5* | *10.15* |
| *Kokomo,Ind. C16* | *10.00* |
| LosAngeles B3 | 10.70 |
| Minnequa,Colo. C10 | 10.65 |
| Pittsburg,Calif. C11 | 10.70 |
| S.Chicago,Ill. R2 | 9.90 |
| S.SanFrancisco C10 | 11.20 |
| SparrowsPt.,Md. B2 | 10.00 |
| Sterling,Ill.(1) N15 | 9.90 |

### WIRE, Barbed

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 184** |
| Aliquippa,Pa. J5 | 184§ |
| Atlanta A11 | 190* |
| Bartonville,Ill. K4 | 193 |
| Crawfordsville,Ind. M8 | 193 |
| Donora,Pa. A7 | 184† |
| Duluth A7 | 184† |
| Fairfield,Ala. T2 | 184† |
| *Houston,Tex. S5* | *189*** |
| Jacksonville,Fla. M8 | 198 |
| Johnstown,Pa. B2 | 188* |
| Joliet,Ill. A7 | 184† |
| *KansasCity,Mo. S5* | *189*** |
| *Kokomo,Ind. C16* | *186†* |
| Minnequa,Colo. C10 | 192** |
| Monessen,Pa. P7 | 191* |
| Pittsburg,Calif. C11 | 204† |
| Rankin,Pa. A7 | 184† |
| S.Chicago,Ill. R2 | 184** |
| S.SanFrancisco C10 | 207** |
| SparrowsPoint,Md. B2 | 190* |
| Sterling,Ill.(1) N15 | 188* |

### WOVEN FENCE, 9-15 Ga.

| | Col. |
|---|---|
| Ala.City,Ala. R2 | 181** |
| Aliq'ppa,Pa. 9-14½ga. J5 | 184§ |
| Atlanta A11 | 182* |
| Bartonville,Ill. K4 | 187 |
| Crawfordsville,Ind. M8 | 187 |
| Donora,Pa. A7 | 176† |
| Duluth A7 | 176† |
| Fairfield,Ala. T2 | 176† |
| *Houston,Tex. S5* | *181*** |
| Jacksonville,Fla. M8 | 192 |
| Johnstown,Pa.(43) B2 | 180* |
| Joliet,Ill. A7 | 176† |
| *KansasCity,Mo. S5* | *181*** |
| *Kokomo,Ind. C16* | *178†* |
| Minnequa,Colo. C10 | 186** |
| Monessen,Pa. 9 ga. P7 | 185* |
| Pittsburg,Calif. C11 | 199† |
| Rankin,Pa. A7 | 176† |
| S.Chicago,Ill. R2 | 176** |
| Sterling,Ill.(1) N15 | 180* |

### WIRE (16 gage)

| | An'ld Stone | Galv. Stone |
|---|---|---|
| Ala.City,Ala.R2 | 15.70 | 17.25** |
| Bartonville K4 | 16.10 | 18.05 |
| Buffalo W12 | 16.10 | .... |
| Cleveland A7 | 15.70 | 17.25† |
| Crawf'dsville M8 | 16.20 | 18.15 |
| Fostoria,O. S1 | 16.20 | 17.75† |
| *Houston S5* | *15.95* | *17.50*** |
| Jacksonville M8 | 16.45 | 18.40 |
| Johnstown B2 | 16.10 | 18.05* |
| *Kan.City,Mo. S5* | *15.95* | *17.50*** |
| *Kokomo C16* | *15.80* | *17.35†* |
| Minnequa C10 | 16.45 | 18.15** |
| P'lm'r,Mass.W12 | 16.10 | 17.65* |
| Pitts.,Calif. C11 | 16.05 | 17.60† |
| SparrowsPt. B2 | 16.20 | 18.15* |
| Sterling(1) N15 | 16.10 | 18.05* |
| Waukegan A7 | 15.70 | 17.25† |
| Worcester A7 | 16.00 | .... |

### WIRE, Merchant Quality (6 to 8 gage)

| | An'ld | Galv. |
|---|---|---|
| Ala.City,Ala. R2 | 7.95 | 8.35** |
| Aliquippa J5 | 8.10 | 8.625§ |
| Atlanta A11 | 8.05 | 8.65* |
| Bartonville(48) K4 | 8.20 | 8.80 |
| Buffalo W12 | 8.10 | 8.50† |
| Cleveland A7 | 7.95 | ... |
| Crawfordsville M8 | 8.20 | 8.80 |
| Donora,Pa. A7 | 7.95 | 8.35† |
| Duluth A7 | 7.95 | 8.35† |
| Fairfield T2 | 7.95 | 8.35† |
| *Houston(48) S5* | *8.20* | *8.60*** |
| Jacks'ville,Fla. M8 | 8.45 | 9.05 |
| *Johnstown B2(48)* | *7.95* | *8.55** |
| Joliet,Ill. A7 | 7.95 | 8.35† |
| *Kans.City(48) S5* | *8.20* | *8.60*** |
| *Kokomo C16* | *8.05* | *8.45†* |
| LosAngeles B3 | 8.90 | 9.50* |
| Minnequa C10 | 8.35 | 8.75** |
| Monessen P7 (48) | 8.10 | 8.70* |
| Palmer,Mass. W12 | 8.40 | 8.80† |
| Pitts.,Calif. C11 | 8.90 | 9.30† |
| Portsmouth,O. P12 | 8.10 | .... |
| Rankin,Pa. A7 | 7.95 | 8.35† |
| S.Chicago R2 | 7.95 | 8.35** |
| S.SanFran. C10 | 9.05 | 9.45** |
| *Spar'wsPt. B2(48)* | *8.05* | *8.65** |
| Sterling(1)(48)N15 | 7.95 | 8.55* |
| Struth'rs,O.(48) Y1 | 7.95 | 8.45‡ |
| Worcester,Mass. A7 | 8.25 | 8.65† |

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

### BALE TIES, Single Loop

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 190 |
| Atlanta A11 | 192 |
| Bartonville,Ill. K4 | 197 |
| Crawfordsville,Ind. M8 | 197 |
| Donora,Pa. A7 | 190 |
| Duluth A7 | 190 |
| Fairfield,Ala. T2 | 190 |
| *Houston S5* | *195* |
| Jacksonville,Fla. M8 | 202 |
| Joliet,Ill. A7 | 190 |
| *KansasCity,Mo. S5* | *195* |
| *Kokomo,Ind. C16* | *192* |
| Minnequa,Colo. C10 | 200 |
| Pitts.,Calif. C11 | 214 |
| S.Chicago,Ill. R2 | 190 |
| SparrowsPoint,Md. B2 | 192 |
| Sterling,Ill. N15 | 190 |
| Tonawanda,N.Y. B12 | 169 |
| Williamsport,Pa. S19 | 175 |

### FENCE POSTS

| | |
|---|---|
| ChicagoHts.,Ill. C2, I-2 | 167 |
| Duluth A7 | 167 |
| Franklin,Pa. F5 | 167 |
| Huntington,W.Va. W7 | 169 |
| Johnstown,Pa. B2 | 167 |
| Marion,O. P11 | 167 |
| Minnequa,Colo. C10 | 172 |
| Moline,Ill. R2 | 172 |
| S.Chicago,Ill. R2 | 167 |
| Sterling,Ill. N15 | 167 |
| Tonawanda,N.Y. B12 | 169 |
| Williamsport,Pa. S19 | 175 |

## FASTENERS

(Based discounts, full container quantity, per cent off list, f.o.b. mill)

### BOLTS

| | |
|---|---|
| **Carriage, Machine Bolts** | |
| Full Size Body (cut thread) | |
| ½ in. and smaller: | |
| 6 in. and shorter | 55 |
| Longer than 6 in. | 46.5 |
| $\frac{9}{16}$ in. thru 1 in.: | |
| 6 in. and shorter | 46.5 |
| Longer than 6 in. | 44 |
| 1⅛ in. and larger: | |
| All lengths | 44 |
| Undersized Body (rolled thread) | |
| ½ in. and smaller: | |
| 6 in. and shorter | 55 |
| **Carriage, Machine, Lag Bolts Hot Galvanized:** | |
| ½ in. and smaller: | |
| 6 in. and shorter | 35 |
| Longer than 6 in. | 23 |
| $\frac{9}{16}$ in. thru 1 in.: | |
| 6 in. and shorter | 20 |
| Longer than 6 in. | 20 |
| 1⅛ in. and larger: | |
| All lengths | 20 |
| **Lag Bolts** | |
| All diameters: | |
| 6 in. and shorter | 55 |
| Longer than 6 in. | 47 |
| **Plow and Tap Bolts** | |
| ½ in. and smaller by 6 in. and shorter | 54 |
| Larger than ½ in. or longer than 6 in. | 47 |
| **Blank Bolts** | 47 |
| **Step, Elevator, Tire Bolts** | 54 |

### NUTS

| | |
|---|---|
| **Reg. & Heavy Square Nuts:** | |
| All sizes | 59 |
| **Square Nuts, Reg. & Heavy, Hot Galvanized:** | |
| All sizes | 45 |
| **Hex Nuts, Reg. & Heavy, Hot Pressed:** | |
| ¾ in. and smaller | 63 |
| ⅞ in. to 1 in. incl. | 59.5 |
| 1⅛ in. to 1½ in., incl. | 64 |
| 1⅝ in. and larger | 58 |
| **Hex Nuts, Reg. & Heavy, Cold Punched:** | |
| ¾ in. and smaller | 63 |
| ⅞ in. to 1⅛ in., incl. | 59.5 |
| 1¼ in. and larger | 58 |
| **Hex Nuts, All Types, Hot Galvanized:** | |
| ¾ in. and smaller | 50 |
| ⅞ in. to 1 in., incl. | 46 |
| 1⅛ in. to 1½ in., incl. | 51 |
| **Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):** | |
| ¾ in. and smaller | 63 |
| ⅞ in. to 1½ in., incl. | 59.5 |
| 1⅝ in. and larger | 58 |
| **Hex Nuts, Finished (Incl. Slotted and Castellated):** | |
| 1 in. and smaller | 65 |
| 1⅛ in. to 1½ in., incl. | 62 |
| 1⅝ in. and larger | 58 |

### CAP AND SET SCREWS

(Based discounts, packages, per cent off list f.o.b. mill)

| | |
|---|---|
| **Hex Head Cap Screws, Coarse or Fine Thread Bright:** | |
| 6 in. and shorter: | |
| ⅝ in. and smaller | 47 |
| ¾, ⅞ and 1 in. diam. | 31 |
| Longer than 6 in.: | |
| ⅝ in. and smaller | 18.5 |
| ¾, ⅞ and 1 in. diam. | 5.5 |
| **High Carbon, Heat Treated:** | |
| 6 in. and shorter: | |
| ⅝ in. and smaller | 34 |
| ¾, ⅞ and 1 in. diam. | 13 |
| Longer than 6 in.: | |
| ⅝ in. and smaller | +1 |
| ¾, ⅞ and 1 in. diam. | +19 |
| **Fillister Head, Coarse Thread:** | |
| Listed Sizes | +31 |
| **Flat Head, Coarse Head:** | |
| ¼ in. and smaller by 6 in. and shorter | +57 |
| **Set Screws, Square Head, Cup Point, Coarse Thread:** | |
| Through 1 in. diam.: | |
| 6 in. and shorter | 11 |
| Longer than 6 in. | +10 |

## RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85

$\frac{7}{16}$-in. under List less 26.5%

# BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

| O.D. In. | B.W. Gage | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. |
|---|---|---|---|---|
| 1 | 13 | .... | 23.56 | 22.84 |
| 1¼ | 13 | .... | 27.92 | 22.68 |
| 1½ | 13 | 26.34 | 30.86 | 25.08 |
| 1¾ | 13 | 31.12 | 36.45 | 29.64 |
| 2 | 13 | 34.88 | 40.85 | 33.21 |
| 2¼ | 13 | 39.29 | 46.01 | 37.42 |
| 2¼ | 12 | 42.64 | 49.94 | 40.61 |
| 2½ | 12 | 46.98 | 55.01 | 44.73 |
| 2¾ | 12 | 50.86 | 59.57 | 48.44 |
| 3 | 12 | 54.24 | 63.53 | 51.66 |

# RAILWAY MATERIALS

| RAILS | Standard | | | Tee Rails |
|---|---|---|---|---|
| | No. 1 | No. 2 | All No. 2 | 60 lb Under |
| Bessemer,Pa. U5 | 5.075 | 4.975 | 5.025 | 6.00 |
| Ensley Ala. T2 | 5.075 | 4.975 | .... | 6.00 |
| Fairfield,Ala. T2 | .... | .... | .... | 6.00 |
| Gary Ind. U5 | 5.075 | 4.975 | 5.025 | ... |
| Huntington,W.Va. W7 | .... | .... | .... | 6.15 |
| IndianaHarbor,Ind. I-2 | 5.075 | 4.975 | 5.025 | ... |
| Johnstown,Pa. B2 | .... | .... | ... | (16)6.00 |
| Lackawanna,N.Y. B2 | 5.075 | 4.975 | ... | (16)6.00 |
| Minnequa,Colo. C10 | 5.075 | 4.975 | .... | 6.50 |
| Steelton Pa. B2 | 5.075 | 4.975 | .... | ... |
| Williamsport,Pa. S19 | .... | .... | .... | 6.15 |

### TIE PLATES

| | |
|---|---|
| Fairfield,Ala. T2 | 6.025 |
| Gary,Ind. U5 | 6.025 |
| Ind.Harbor,Ind. I-2 | 6.025 |
| Lackawanna,N.Y. B2 | 6.025 |
| Minnequa,Colo. C10 | 6.025 |
| Seattle B3 | 6.175 |
| Steelton,Pa. B2 | 6.025 |
| Torrance,Calif. C11 | 6.175 |

### JOINT BARS

| | |
|---|---|
| Bessemer,Pa. U5 | 6.35 |
| Fairfield,Ala. T2 | 6.35 |
| Ind.Harbor,Ind. I-2 | 6.35 |
| Joliet,Ill. U5 | 6.35 |
| Lackawanna,N.Y. B2 | 6.35 |
| Minnequa,Colo. C10 | 6.35 |
| Steelton,Pa. B2 | 6.35 |

### AXLES

| | |
|---|---|
| Ind.Harbor,Ind. S13 | 8.10 |
| Johnstown,Pa. B2 | 8.10 |

### TRACK BOLTS, Untreated

| | |
|---|---|
| Cleveland R2 | 13.10 |
| Lebanon,Pa. B2 | 13.10 |
| Minnequa,Colo. C10 | 13.10 |
| Pittsburgh P14 | 13.10 |
| Seattle B3 | 13.60 |

### SCREW SPIKES

| | |
|---|---|
| Cleveland R2 | 12.85 |
| Pittsburgh P14 | 12.85 |

### STANDARD TRACK SPIKES

| | |
|---|---|
| Fairfield, Ala. T2 | 8.775 |
| Ind.Harbor,Ind. I-2, Y1 | 8.775 |
| KansasCity, Mo. S5 | 8.775 |
| Lebanon,Pa. B2 | 8.775 |
| Minnequa,Colo. C10 | 8.775 |
| Pittsburgh J5 | 8.775 |
| Seattle B3 | 9.275 |
| S.Chicago,Ill. R2 | 8.775 |
| Struthers,O. Y1 | 8.775 |
| Youngstown R2 | 8.775 |

## Footnotes

(1) Chicago base.
(2) Angles,flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

## SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | 2 | | 2½ | | 3 | | 3½ | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | | $1.48 | | $1.92 | |
| Pounds Per Ft | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | | 14.81 | | 19.18 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | +2 | +20 | 4.5 | +14.25 | 7 | +11.75 | 8.5 | +10.25 | 8.5 | +10.25 | 8.25 | +10.5 | 10.75 | +8 |
| Ambridge, Pa. N2 | +2 | .... | 4.5 | .... | 7 | .... | 8.5 | .... | 8.5 | .... | 8.25 | .... | 10.75 | .... |
| Lorain, O. N3 | +2 | +20 | 4.5 | +14.25 | 7 | +11.75 | 8.5 | +10.25 | 8.5 | +10.25 | 8.25 | +10.5 | 10.75 | +8 |
| Youngstown Y1 | 0.5 | +17.5 | 4.5 | +14.25 | 7 | +11.75 | 8.5 | +10.25 | 8.5 | +10.25 | 8.25 | +10.5 | 10.75 | +8 |

## ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Youngstown R2 | +2 | +20 | 4.5 | +14.25 | 7 | +11.75 | 8.5 | +10.25 | 8.5 | +10.25 | 8.25 | +10.5 | 10.75 | +8 |

## BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | ⅛ | | ¼ | | ⅜ | | ½ | | ¾ | | 1 | | 1¼ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 5.5c | | 6c | | 6c | | 8.5c | | 11.5c | | 17c | | 23c | |
| Pounds Per Ft | 0.24 | | 0.42 | | 0.57 | | 0.85 | | 1.13 | | 1.68 | | 2.28 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | .... | .... | .... | .... | .... | .... | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |
| Alton, Ill. L1 | .... | .... | .... | .... | .... | .... | 10.5 | +3.75 | 13.5 | +4.75 | 16 | +1.25 | 18.5 | 0.5 |
| Benwood, W. Va. W10 | 10 | +20.5 | +0.25 | +27.75 | +9.75 | +37.25 | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |
| Butler, Pa. F6 | 10 | +20.5 | 0.5 | +27 | +8.5 | +36 | .... | .... | .... | .... | .... | .... | .... | .... |
| Etna, Pa. N2 | .... | .... | .... | .... | .... | .... | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |
| Fairless, Pa. N3 | .... | .... | .... | .... | .... | .... | 10.5 | +8.75 | 13.5 | +4.75 | 16 | +1.25 | 18.5 | 0.5 |
| Fontana, Calif. K1 | .... | .... | .... | .... | .... | .... | 0 | +19.25 | 3 | +15.25 | 5.5 | +11.75 | 8 | +10 |
| Indiana Harbor, Ind. Y1 | .... | .... | .... | .... | .... | .... | 11.5 | +7.75 | 14.5 | +3.75 | 17 | +0.25 | 19.5 | 1.5 |
| Lorain, O. N3 | .... | .... | .... | .... | .... | .... | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |
| Sharon, Pa. S4 | 11 | +19.5 | 1.5 | +26 | +7.5 | +35 | .... | .... | .... | .... | .... | .... | .... | .... |
| Sharon, Pa. M6 | .... | .... | .... | .... | .... | .... | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |
| Sparrows Pt., Md. B2 | 9 | +21.5 | 0.5 | +28 | +9.5 | +37 | 10.5 | +8.75 | 13.5 | +4.75 | 16 | +1.25 | 18.5 | 0.5 |
| Wheatland, Pa. W9 | 11 | +19.5 | 1.5 | +26 | +7.5 | +35 | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |
| Youngstown R2, Y1 | .... | .... | .... | .... | .... | .... | 12.5 | +6.75 | 15.5 | +2.75 | 18 | 0.75 | 20.5 | 2.5 |

| Size—Inches | 1½ | | 2 | | 2½ | | 3 | | 3½ | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 27.5c | | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | |
| Pounds Per Ft | 2.73 | | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | .... | .... | .... | .... |
| Alton, Ill. L1 | 19 | 1.5 | 19.5 | 2 | 21 | 2.75 | 21 | 2.75 | .... | .... | .... | .... |
| Benwood, W. Va. W10 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | 13.5 | +0.75 | 13.5 | +5.25 |
| Etna, Pa. N2 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | 13.5 | +5.25 | 13.5 | +5.25 |
| Fairless, Pa. N3 | 19 | 1.5 | 19.5 | 2 | 21 | 2.75 | 21 | 2.75 | 11.5 | +7.25 | 11.5 | +7.25 |
| Fontana, Calif. K1 | 8.5 | +9 | 9 | +8.5 | 10.5 | +7.75 | 10.5 | +7.75 | 1 | +17.75 | 1 | +17.75 |
| Indiana Harbor, Ind. Y1 | 20 | 2.5 | 20.5 | 3 | 22 | 3.75 | 22 | 3.75 | 12.5 | +6.25 | 12.5 | +6.25 |
| Lorain, O. N3 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | .... | .... | .... | .... |
| Sharon Pa. M6 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | .... | .... | .... | .... |
| Sparrows Pt. Md. B2 | 19 | 1.5 | 19.5 | 2 | 21 | 2.75 | 21 | 2.75 | 11 | +7.25 | 11 | +7.25 |
| Wheatland, Pa. W9 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | 13.5 | +5.25 | 13.5 | +5.25 |
| Youngstown R2, Y1 | 21 | 3.5 | 21.5 | 4 | 23 | 4.75 | 23 | 4.75 | 13.5 | +5.25 | 13.5 | +5.25 |

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*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

# Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

| AISI Type | —Rerolling— | | Forging | Seamless Tube | H.R. Strip | Wire Rods; C.F. Wire | Bars; Structural Shapes | Plates | Sheets | C.R. Strip; Flat Wire |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ingot | Slabs | —Billets— | | | | | | | |
| 201 | 19.75 | 24.50 | .... | .... | 33.00 | .... | .... | .... | 45.00 | 41.50 |
| 202 | 21.00 | 27.25 | 33.00 | .... | 35.75 | 37.25 | 39.25 | 41.25 | 45.25 | 45.25 |
| 301 | 20.50 | 25.25 | 33.75 | .... | 34.00 | 38.25 | 40.50 | 42.50 | 47.25 | 43.75 |
| 302 | 22.00 | 28.00 | 34.00 | .... | 36.75 | 38.75 | 40.75 | 43.00 | 47.50 | 47.50 |
| 302B | 21.75 | 28.25 | 35.25 | .... | 40.25 | 38.75 | 40.75 | 43.00 | 50.00 | 50.00 |
| 303 | .... | 28.50 | 37.00 | .... | .... | 41.50 | 43.75 | 45.50 | 52.00 | 52.00 |
| 304 | 23.25 | 29.25 | 36.00 | .... | 39.75 | 40.75 | 43.00 | 45.75 | 50.25 | 50.25 |
| 304L | .... | .... | 43.50 | .... | 46.75 | 48.25 | 50.50 | 53.25 | 57.75 | 57.75 |
| 305 | 24.75 | 32.50 | 37.75 | .... | 43.00 | 40.75 | 43.00 | 46.25 | 53.50 | 53.50 |
| 308 | 26.75 | 34.00 | 42.50 | .... | 45.50 | 48.25 | 50.50 | 55.00 | 57.50 | 57.50 |
| 309 | 34.75 | 44.00 | 51.50 | .... | 58.50 | 57.50 | 60.50 | 64.25 | 73.50 | 73.50 |
| 310 | 42.25 | 53.75 | 69.00 | .... | 75.50 | 77.50 | 81.50 | 83.25 | 87.00 | 87.00 |
| 314 | .... | .... | .... | .... | .... | 77.50 | .... | 83.25 | .... | .... |
| 316 | 35.25 | 44.50 | 56.25 | .... | 63.50 | 63.50 | 66.75 | 70.25 | 74.75 | 74.75 |
| 316L | .... | .... | 63.75 | .... | 70.00 | 71.00 | 74.25 | 77.75 | 82.25 | 82.25 |
| 317 | 43.00 | 54.50 | 70.00 | .... | 81.50 | 79.50 | 83.50 | 86.25 | 93.25 | 93.25 |
| 321 | 28.25 | 35.75 | 42.25 | .... | 48.75 | 48.00 | 50.25 | 54.50 | 60.00 | 60.00 |
| 18-8CbTa | 32.75 | 42.00 | 50.25 | .... | 58.25 | 56.25 | 59.00 | 63.75 | 73.00 | 73.00 |
| 403 | .... | .... | 30.75 | .... | .... | 34.50 | 36.25 | 38.75 | 46.50 | 46.50 |
| 405 | 18.75 | 24.50 | 28.50 | .... | 34.50 | 32.50 | 34.00 | 36.00 | 45.00 | 45.00 |
| 410 | 16.00 | 20.75 | 27.25 | .... | 29.75 | 31.00 | 32.50 | 33.75 | 38.75 | 38.75 |
| 416 | .... | .... | 27.75 | .... | .... | 31.50 | 33.00 | 34.75 | 46.50 | 46.50 |
| 420 | .... | 32.25 | 33.00 | .... | 40.25 | 37.75 | 39.75 | 43.50 | 59.50 | 59.50 |
| 430 | 16.25 | 21.00 | 27.75 | .... | 30.75 | 31.50 | 33.00 | 34.50 | 39.25 | 39.25 |
| 430F | .... | .... | 28.25 | .... | .... | 32.00 | 33.50 | 35.25 | 49.75 | 49.75 |
| 431 | .... | 27.25 | 35.50 | .... | .... | 39.75 | 41.75 | 43.50 | 53.00 | 53.00 |
| 446 | .... | .... | 37.75 | .... | 56.75 | 42.50 | 44.75 | 46.00 | 67.25 | 67.25 |

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

# Clad Steel

| | —Plates— | | | | Sheets |
|---|---|---|---|---|---|
| | Carbon Base | | | | Carbon Base |
| | 5% | 10% | 15% | 20% | 20% |
| Stainless | | | | | |
| 302 | .... | .... | .... | .... | 33.25 |
| 304 | .... | 34.50 | .... | 41.50 | 35.25 |
| 304-L | .... | 37.20 | .... | 44.65 | .... |
| 316 | .... | 38.70 | .... | 46.65 | 52.25 |
| 316-L | .... | 45.70 | .... | 54.35 | .... |
| 316-CB | .... | 45.90 | .... | 54.75 | .... |
| 321 | .... | 36.35 | .... | 43.40 | 42.00 |
| 347 | .... | 39.50 | .... | 48.45 | 51.00 |
| 405 | .... | 29.20 | .... | 37.05 | .... |
| 410 | .... | 28.70 | .... | 36.55 | .... |
| 430 | .... | 28.70 | .... | 36.55 | .... |
| Inconel | 45.70 | 54.80 | 63.85 | 73.00 | .... |
| Nickel | 37.95 | 46.25 | 54.60 | 62.95 | .... |
| Nickel, Low Carbon | 38.25 | 46.90 | 55.60 | 64.40 | .... |
| Monel | 40.30 | 49.10 | 57.95 | 66.80 | .... |
| Copper* | .... | .... | .... | .... | 46.00 |

| | Strip, Carbon Base —Cold Rolled— 10% | Both Sides |
|---|---|---|
| Copper* | 33.60 | 41.40 |

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*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22. Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

# Tool Steel

| Grade | $ per lb | Grade | $ per lb |
|---|---|---|---|
| Regular Carbon | 0.290 | Cr Hot Work | 0.45-0.495 |
| Extra Carbon | 0.345 | W-Cr Hot Work | 0.043-0.475 |
| Special Carbon | 0.41-0.45 | V-Cr Hot Work | 0.460 |
| Oil Hardening | 0.450 | Hi-Carbon-Cr | 0.830 |

Grade by Analysis (%)

| W | Cr | V | Co | Mo | $ per lb |
|---|---|---|---|---|---|
| 20.25 | 4.25 | 1.6 | 12.25 | ... | 4.170 |
| 18.25 | 4.25 | 1 | 4.75 | ... | 2.385 |
| 18 | 4 | 2 | 9 | ... | 2.7575 |
| 18 | 4 | 2 | .... | ... | 1.845 |
| 18 | 4 | 1 | .... | ... | 1.680 |
| 9 | 3.5 | .. | .... | ... | 1.275 |
| 13.5 | 4 | 3 | .... | ... | 1.945 |
| 13.75 | 3.75 | 2 | 5 | ... | 2.325 |
| 6.4 | 4.5 | 1.9 | .... | 5 | 1.185 |
| 6 | 4 | 3 | .... | 6 | 1.430 |
| 1.5 | 4 | 1 | .... | 8.5 | 1.040 |

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

# Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

| | Basic | No. 2 Foundry | Malle-able | Besse-mer |
|---|---|---|---|---|
| *Birmingham District* | | | | |
| AlabamaCity,Ala. R2 | 58.50 | 59.00 | .... | .... |
| Birmingham R2 | 58.50 | 59.00‡ | .... | .... |
| Birmingham U6 | .... | 59.00‡ | 63.00 | .... |
| Woodward,Ala. W15 | 58.50 | 59.00‡ | 63.00 | .... |
| Cincinnati, deld. | .... | 66.70 | .... | .... |
| *Buffalo District* | | | | |
| Buffalo H1, R2 | 62.50 | 63.00 | 63.50 | 64.00 |
| Tonawanda,N.Y. W12 | 62.50 | 63.00 | 63.50 | 64.00 |
| N.Tonawanda,N.Y. T9 | .... | 63.00 | 63.50 | 64.00 |
| Boston, deld. | 73.79 | 74.29 | 74.79 | .... |
| Rochester,N.Y., deld. | 65.52 | 66.02 | 66.52 | .... |
| Syracuse,N.Y., deld. | 66.62 | 67.12 | 67.62 | .... |
| *Chicago District* | | | | |
| Chicago I-3 | 62.50 | 63.00 | 63.00 | 63.50 |
| Gary,Ind. U5 | 62.50 | .... | 63.00 | .... |
| S.Chicago,Ill. R2 | 62.50 | .... | 63.00 | .... |
| S.Chicago,Ill. Y1 | 62.50 | 63.00 | 63.00 | .... |
| S.Chicago,Ill. U5 | 62.50 | .... | 63.00 | 63.50 |
| S.Chicago,Ill. W14 | 62.50 | .... | 63.00 | 63.50 |
| Milwaukee, deld. | 64.80 | 65.30 | 65.30 | 65.80 |
| Muskegon,Mich., deld. | .... | 69.68 | 69.68 | .... |
| *Cleveland District* | | | | |
| Cleveland R2, A7 | 62.50 | 63.00 | 63.00 | 63.50 |
| Akron,O., deld. | 65.25 | 65.75 | 65.75 | 66.25 |
| *Mid-Atlantic District* | | | | |
| Bethlehem,Pa. B2 | 64.50 | 65.00 | 65.50 | 66.00 |
| NewYork, deld. | .... | 69.01 | 69.51 | .... |
| Newark,N.J., deld. | 67.70 | 68.20 | 68.70 | 69.20 |
| Birdsboro,Pa. B10 | 64.50 | 65.00 | 65.50 | 66.00 |
| Chester,Pa. P4 | 64.50 | 65.00 | 65.50 | .... |
| Philadelphia, deld. | 66.26 | 66.76 | 67.26 | .... |
| Steelton,Pa. B2 | 64.50 | 65.00 | 65.50 | 66.00 |
| Swedeland,Pa. A3 | 64.50 | 65.00 | 65.50 | 66.00 |
| Philadelphia, deld. | 66.26 | 66.76 | 67.26 | 67.76 |
| Troy,N.Y. R2 | 64.50 | 65.00 | 65.50 | 66.00 |
| *Pittsburgh District* | | | | |
| NevilleIsland,Pa. P6 | 62.50 | 63.00 | 63.00 | 63.50 |
| Pittsburgh (N&S sides), Aliquippa, deld. | .... | 64.45 | 64.45 | 64.98 |
| McKeesRocks,Pa. deld. | .... | 64.10 | 64.10 | 64.63 |
| Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld. | .... | 64.76 | 64.76 | 65.29 |
| Verona, Trafford,Pa., deld. | 64.79 | 65.32 | 65.32 | 65.85 |
| Brackenridge,Pa., deld. | 65.10 | 65.60 | 65.60 | 66.13 |
| Bessemer,Pa. U5 | 62.50 | .... | 63.00 | 63.50 |
| Clairton,Rankin,S.Duquesne,Pa. U5 | 62.50 | .... | .... | .... |
| Midland,Pa. C18 | 62.50 | .... | .... | .... |

| *Youngstown District* | Basic | No. 2 Foundry | Malle-able | Besse-mer |
|---|---|---|---|---|
| Hubbard,O. Y1 | .... | .... | 63.00 | .... |
| Sharpsville,Pa. S6 | 62.50 | .... | 63.00 | 63.50 |
| Youngstown Y1 | .... | .... | 63.00 | 63.50 |
| Mansfield,O., deld. | 67.40 | .... | 67.90 | 68.40 |
| Duluth I-3 | 62.50 | 63.00 | 63.00 | 63.50 |
| Erie,Pa. I-3 | 62.50 | 63.00 | 63.00 | 63.50 |
| Everett,Mass. E1 | 63.25 | 63.75 | 64.25 | .... |
| Fontana,Calif. K1 | 70.00 | 70.50 | .... | .... |
| Geneva,Utah C11 | 62.50 | 63.00 | .... | .... |
| GraniteCity,Ill. G4 | 64.40 | 64.90 | 65.40 | .... |
| Ironton,Utah C11 | 62.50 | 63.00 | .... | .... |
| LoneStar,Tex. L6 | 58.50* | 59.00† | .... | .... |
| Minnequa,Colo. C10 | 64.50 | 65.00 | 65.50 | .... |
| Rockwood,Tenn. T3 | .... | 59.00‡ | 63.00 | .... |
| Toledo,O. I-3 | 62.50 | 63.00 | 63.00 | 63.50 |
| Cincinnati, deld. | 68.26 | 68.76 | .... | .... |

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*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.

†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.

‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

## PIG IRON DIFFERENTIALS

*Silicon:* Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

*Manganese:* Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

*Nickel:* Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

## BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

| | |
|---|---|
| Jackson,O. I3, J1 | 71.50 |
| Buffalo H1 | 72.75 |

## ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon: add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

| | |
|---|---|
| CalvertCity,Ky. P15 | $97.50 |
| NiagaraFalls,N.Y. P15 | 97.50 |
| Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2 | 102.00 |
| Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2 | 105.00 |

## LOW PHOSPHORUS PIG IRON, Gross Ton

| | |
|---|---|
| Lyles,Tenn. T3 (Phos. 0.035% max) | $76.50 |
| Rockwood,Tenn. T3 (Phos. 0.035% max) | 76.50 |
| Steelton,Pa. B2 (Phos. 0.035% max) | 70.50 |
| Philadelphia, deld. | 74.05 |
| Troy,N.Y. R2 (Phos. 0.035% max) | 70.50 |
| Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max) | 67.50 |
| Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max) | 67.50 |
| Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max) | 67.50 |
| NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max) | 67.50 |

# Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

| | SHEETS | | | | STRIP | BARS | | | | Standard Structural Shapes | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled | Gal. 10 Ga.† | Stainless Type 302 | Hot-Rolled* | H.R. Merchant Qual. | H.R. Spec. Qual. | C.F. Rds.‡ | H.R. Alloy 4140††[6] | | Carbon | Floor |
| Atlanta | 8.07§ | 9.27§ | 9.83§ | .... | 8.16 | 8.30 | ... | 10.14 | .... | 8.44 | 8.40 | 10.22 |
| Baltimore | 7.79 | 8.99 | 9.12 | .... | 8.27 | 8.34 | 8.87 | 9.09[3] | 15.69 | 8.57 | 8.12 | 9.56 |
| Birmingham | 7.68§ | 8.88§ | 8.85§ | .... | 7.78 | 7.91 | 8.44 | 10.04 | .... | 8.05 | 8.01 | 10.04 |
| Boston | 8.70 | 9.73 | 11.02 | .... | 8.79 | 8.88 | 9.43 | 10.71 | 14.46 | 8.90 | 8.98 | 10.39 |
| Buffalo | 7.75 | 8.90 | 10.72 | .... | 8.00 | 8.00 | 8.70 | 8.70 | 14.30 | 8.25 | 8.25 | 9.80 |
| Chattanooga | 7.90§ | 9.10§ | 9.10§ | .... | 8.00 | 8.13 | 8.66 | 9.96 | .... | 8.27 | 8.23 | 9.98 |
| Chicago | 7.70 | 8.90 | 9.70 | .... | 7.78 | 7.91 | 8.44 | 8.35 | 13.95 | 8.05 | 8.01 | 9.26 |
| Cincinnati | 7.82 | 8.89 | 9.75 | .... | 8.06 | 8.19 | 8.72 | 8.82 | 14.23 | 8.55 | 8.34 | 9.53 |
| Cleveland | 7.68 | 8.88 | 9.60 | .... | 7.88 | 7.99 | 8.52 | 8.60 | 14.03 | 8.38 | 8.21 | 9.46 |
| Denver | 9.55 | 11.09 | 12.41 | .... | 9.70 | 9.75 | ... | 10.54 | 18.89 | 9.60 | 9.50 | 11.15 |
| Detroit | 7.91 | 9.13 | 10.02 | .... | 8.10 | 8.18 | 8.71 | 8.68 | 14.19 | 8.55 | 8.33 | 9.49 |
| Erie, Pa. | 7.75 | 8.88 | 9.60[10] | .... | 7.90 | 8.00 | 8.65 | 8.70[10] | .... | 8.35 | 8.20 | 9.50 |
| Houston | 8.70 | 9.65 | 10.99 | .... | 8.80 | 8.95 | 9.50 | 10.70 | 15.00 | 9.40 | 9.10 | 10.60 |
| Jackson, Miss. | 8.00§ | 9.20§ | 9.22§ | .... | 8.10 | 8.23 | 8.76 | 10.14 | .... | 8.37 | 8.33 | 10.08 |
| Los Angeles | 8.90 | 10.65 | 11.65 | .... | 9.10 | 8.80 | 9.50 | 11.70 | 15.25 | 8.95 | 9.35 | 11.50 |
| Milwaukee | 7.82 | 9.02 | 9.82 | .... | 7.90 | 8.03 | 8.56 | 8.57 | 14.07 | 8.24 | 8.13 | 9.38 |
| Moline, Ill. | 7.48 | 8.59 | 9.45 | .... | 7.56 | 7.62 | ... | 8.10 | ..... | 7.78 | 7.80 | ... |
| New York | 8.35 | 9.53 | 10.23 | 57.73 | 8.81 | 8.83 | 9.38 | 10.61 | 14.37 | 8.74 | 8.78 | 10.05 |
| Norfolk, Va. | 7.85 | ... | ... | .... | 8.30 | 8.35 | ... | 10.80 | .... | 8.60 | 8.10 | 9.60 |
| Philadelphia | 7.89 | 9.08 | 10.12 | .... | 8.58 | 8.37 | 8.90 | 9.12 | 14.15 | 8.38 | 8.28 | 9.37 |
| Pittsburgh | 7.68 | 8.88 | 10.05 | 50.00 | 7.88 | 7.91 | 8.44 | 8.60 | 13.95 | 8.05 | 8.01 | 9.26 |
| Portland, Oreg. | 8.29 | 9.49 | 10.31 | .... | 8.39 | 8.52 | ... | 9.21 | 14.60 | 8.75 | 8.71 | 11.60 |
| Richmond, Va. | 8.05 | ... | 10.09 | .... | 8.45 | 8.70 | 9.20 | 10.00 | .... | 8.80 | 8.35 | 9.70 |
| St. Louis | 8.02 | 9.21 | 10.03 | .... | 8.11 | 8.25 | 8.78 | 8.93 | 14.28 | 8.48 | 8.34 | 9.59 |
| St. Paul | 7.83 | 8.78 | 9.80 | .... | 7.91 | 7.97 | ... | 8.70 | .... | 8.13 | 8.15 | 9.42 |
| San Francisco | 8.75 | 10.30 | 10.80 | .... | 8.95 | 8.80 | 9.35 | 12.30 | 15.25 | 8.85 | 8.85 | 11.15 |
| Seattle | 9.35 | 11.20 | 11.55 | .... | 9.50 | 9.30 | 9.85 | 13.15 | 15.55 | 9.15 | 9.05 | 11.25 |
| Spokane, Wash. | 9.35 | 11.35 | 11.55 | .... | 9.50 | 9.30 | 9.85 | 13.15 | 16.30 | 9.15 | 9.05 | 11.25 |
| Washington | 8.37 | 10.57 | ... | .... | 9.06 | 8.92 | ... | 9.67 | .... | 9.15 | 8.70 | 10.14 |

---

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **½-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [6]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

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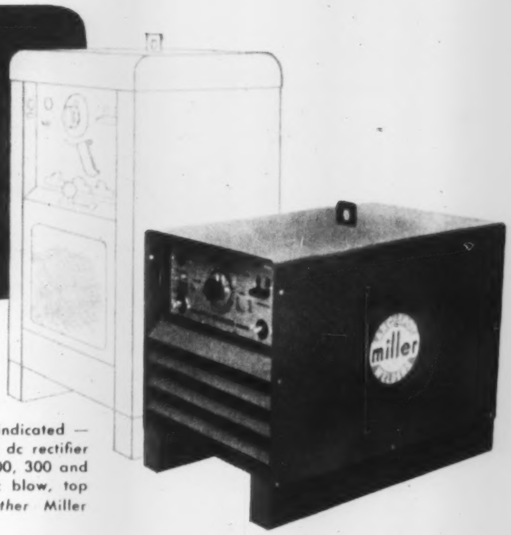
*low-boy?*



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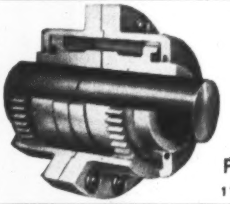

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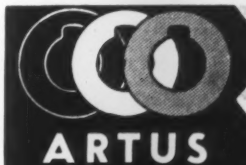

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# Refractories

**Fire Clay Brick (per 1000)**

*High-Heat Duty:* Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.
*Super-Duty:* Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

**Silica Brick (per 1000)**

*Standard:* Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.
*Super-Duty:* Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

**Semisilica Brick (per 1000)**

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

**Ladle Brick (per 1000)**

*Dry Pressed:* Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

**High-Alumina Brick (per 1000)**

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

**Sleeves (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

**Nozzles (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

**Runners (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

**Dolomite (per net ton)**

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

**Magnesite (per net ton)**

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

# Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective $CaF_2$ content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

# Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

| | |
|---|---|
| **Sponge iron:** | Cents |
| **Swedish, c.i.f. Camden, N.J., c.l. in bags** | 8.50 |
| **Domestic:** | |
| F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags | 9.50 |
| F.o.b. Riverton, N.J., in bags | 8.50 |
| **Canadian, f.o.b. shipping point** | 9.50 |
| **Electrolytic iron:** | |
| Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in. | 24.00 |
| Annealed, 99.5% Fe | 36.50 |
| Unannealed (99+ % Fe) | 34.00 |
| Unannealed (99+ % Fe) (minus 325 mesh) | 57.00 |
| Powder Flakes (minus 16, plus 100 mesh) | 31.00 |
| Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh. | |
| **Aluminum:** | |
| Atomized, 500 lb, drum frght, allowed | |
| Carlots | 36.20 |
| Ton lots | 38.20 |
| Antimony, 500 lb lots | 32.00* |
| Brass, 5000-lb lots | 38.50-48.25† |
| Bronze, 5000-lb lots | 59.50-63.00† |
| Copper: | |
| Electrolytic | 14.25* |
| Reduced | 14.25* |
| Lead | 7.50* |
| Manganese: | |
| Minus 35 mesh | 64.00 |
| Minus 100 mesh | 70.00 |
| Minus 200 mesh | 75.00 |
| Nickel, unannealed | $1.00 |
| Nickel-Silver, 5000-lb lots | 58.00-61.00† |
| Phosphor-Copper, 5000-lb lots | 65.00 |
| Silicon | 47.50 |
| Solder | 7.00* |
| Stainless Steel, 302 | 99.00 |
| Stainless Steel, 316 | $1.32 |
| Tin | 14.50* |
| Zinc 5000-lb lots | 19.75-33.00‡ |
| Tungsten: | Dollars |
| Melting grade, 99% 60 to 200 mesh: | |
| 1000 lb and over | 4.50 |
| Less than 1000 lb | 4.65 |
| Chromium, electrolytic 99.8% Cr min. metallic basis | 5.00 |

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni **64% Cu, 18% Zn, 18% Ni.

# Electrodes

Threaded with nipple; unboxed, f.o.b. plant

**GRAPHITE**

| ——Inches—— Diam | Length | Per 100 lb |
|---|---|---|
| 2 | 24 | $57.75 |
| 2½ | 30 | 37.25 |
| 3 | 40 | 35.25 |
| 4 | 40 | 33.25 |
| 5½ | 40 | 33.00 |
| 6 | 60 | 30.00 |
| 7 | 60 | 26.75 |
| 8, 9, 10 | 60 | 26.50 |
| 12 | 72 | 25.50 |
| 14 | 60 | 25.50 |
| 16 | 72 | 24.50 |
| 17 | 60 | 25.50 |
| 18 | 72 | 24.50 |
| 20 | 72 | 24.00 |
| 24 | 84 | 24.75 |

**CARBON**

| Diam | Length | Per 100 lb |
|---|---|---|
| 8 | 60 | 13.30 |
| 10 | 60 | 13.00 |
| 12 | 60 | 12.95 |
| 14 | 60 | 12.85 |
| 14 | 72 | 11.85 |
| 17 | 60 | 11.85 |
| 17 | 72 | 11.40 |
| 20 | 84 | 11.25 |
| 20 | 90 | 11.00 |
| 24 | 72, 84 | 11.25 |
| 24 | 96 | 10.95 |
| 30 | 84 | 11.05 |
| 40, 35 | 110 | 10.70 |
| 40 | 100 | 10.70 |

# Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

| | North Atlantic | South Atlantic | Gulf Coast | West Coast |
|---|---|---|---|---|
| *Deformed Bars, Intermediate, ASTM-A 305* | *$7.40* | *$7.40* | *$7.40* | *$7.65* |
| Bar Size Angles | 7.11 | 7.11 | 7.11 | 7.26 |
| Structural Angles | 7.50 | 7.50 | 7.50 | 7.80 |
| I-Beams | 7.75 | 7.75 | 7.75 | 8.15 |
| *Plates* | *9.50* | *9.50* | *9.50* | *10.00* |
| *Sheets, H.R.* | *8.55* | *8.55* | *8.55* | *8.85* |
| *Sheets, C.R. (drawing quality)* | *8.95* | *8.95* | *8.95* | *9.35* |
| *Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft* | *27.32* | *27.32* | *27.32* | *31.15* |
| Barbed Wire (†) | 6.61 | 6.61 | 6.61 | 6.96 |
| *Merchant Bars* | *7.15* | *7.15* | *7.15* | *7.50* |
| *Hot-Rolled Bands* | *7.25* | *7.25* | *7.25* | *7.65* |
| Wire Rods, Thomas Commercial No. 5 | 6.38 | 6.38 | 6.38 | 6.78 |
| Wire Rods O-H Cold Heading Quality No. 5 | 6.72 | 6.72 | 6.72 | 7.12 |
| *Bright Common Wire Nails* | *7.90* | *7.90* | *7.90* | *8.02* |

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb, net, reel. §Per 100-lb kegs, 20d nails and heavier

# Ores

**Lake Superior Iron Ore**

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

| | |
|---|---|
| Old range bessemer | $11.25 |
| Old range nonbessemer | 11.10 |
| Mesabi bessemer | 11.00 |
| Mesabi nonbessemer | 10.85 |
| Open-hearth lump | 12.10 |
| High phos. | 10.85 |

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

**Eastern Local Iron Ore**

Cents per unit, deld. E. Pa.

| | |
|---|---|
| Foundry and basic 52-62% concentrates contract | 17.00-18.00 |

**Foreign Iron Ore**

Cents per unit, c.i.f. Atlantic ports

| | |
|---|---|
| Swedish basic, 65% | 25.00 |
| N. African hematite (spot) | nom. 24.00-25.00 |
| Brazilian iron ore, 68-69% | 32.00 |

**Tungsten Ore**

Net ton unit, before duty

| | |
|---|---|
| Foreign, wolframite, good commercial quality | $29.00-30.00 |
| Domestic, scheelite, mine | 55.00 |

**Manganese Ore**

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U.S. ports, duty for buyer's account; 46-47%, $1.15. Spot cargoes, 10 to 15% higher.

**Chrome Ore**

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

*Indian and Rhodesian*

| | |
|---|---|
| 48% 3:1 | $52.00-53.00 |
| 48% 2.8:1 | nom. 49.00-50.00 |
| 48% no ratio | 39.00-40.00 |

*South African Transvaal*

| | |
|---|---|
| 48% no ratio | $37.50-39.00 |
| 44% no ratio | 26.00-27.00 |

*Turkish*

| | |
|---|---|
| 48% 3:1 | $60.00-63.00 |

*Domestic*

Rail nearest seller

| | |
|---|---|
| 48% 3:1 | $39.00 |

**Molybdenum**

| | |
|---|---|
| Sulphide concentrate, per lb of Mo content, mines, unpacked | $1.18 |

**Antimony Ore**

Per unit of Sb content, c.i.f. seaboard

| | |
|---|---|
| 55-60% | $3.35-3.80 |
| 60-65% | 3.80-3.90 |

**Vanadium Ore**

Cents per lb $V_2O_5$

| | |
|---|---|
| Domestic | 31.00 |

# Metallurgical Coke

Price per net ton
**Beehive Ovens**

| | |
|---|---|
| Connellsville, furnace | $14.25-14.75 |
| Connellsville, foundry | 17.00-18.00 |

**Oven Foundry Coke**

| | |
|---|---|
| Birmingham, ovens | $27.60 |
| Cincinnati, deld. | 32.53 |
| Buffalo, ovens | 29.50 |
| Camden, N.J., ovens | 28.50 |
| Detroit, ovens | 29.50 |
| Pontiac, deld. | 31.15 |
| Saginaw, deld. | 32.73 |
| Erie, Pa., ovens | 29.50 |
| Everett, Mass., ovens New England, deld. | 30.55* |
| Indianapolis, ovens | 28.75 |
| Ironton, O., ovens | 28.00 |
| Cincinnati, deld. | 28.25 |
| Kearny, N.J., ovens | 28.75 |
| Lone Star, Tex., ovens | 25.50 |
| Milwaukee, ovens | 29.50 |
| Painesville, O., ovens | 29.50 |
| Cleveland, deld. | 31.55 |
| Philadelphia, ovens | 28.50 |
| St. Louis, ovens | 28.50 |
| Neville Island (Pittsburgh), Pa., ovens | 28.25 |
| St. Paul, ovens | 28.50 |
| Chicago, deld. | 31.82 |
| Swedeland, Pa., ovens | 28.50 |
| Terre Haute, Ind., ovens | 28.75 |

*Or within $4.55 freight zone from works.

# Coal Chemicals

Spot, cents per gallon, ovens

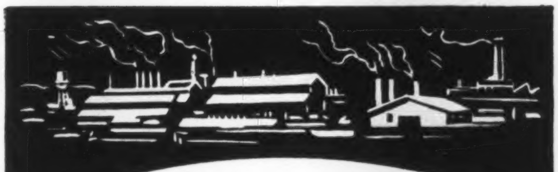
| | |
|---|---|
| Pure benzene | 36.00 |
| Toluene, one deg. | 32.00-34.00 |
| Industrial xylene | 32.00-35.00 |

Per ton, bulk, ovens

| | |
|---|---|
| Ammonium sulfate | $32.00 |

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.



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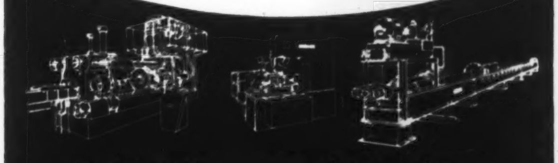

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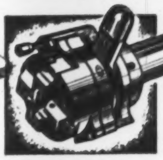

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# New Buying Pushes Scrap Higher

## STEEL's composite rises sharply, reflecting advances on leading steelmaking grades at Pittsburgh and Chicago. Undertone of market continues strong

Scrap Prices, Page 198

**Chicago**—Prices on steelmaking grades of scrap are up $1 to $3 a ton, culminating the firming up that has been developing the last two weeks. This evaluation was provided by: 1. Brokers' offering prices to dealers which equaled, or exceeded, prices paid in the last mill purchases. 2. A mill acquisition of No. 2 heavy melting steel at $2 a ton above the last transaction.

**Pittsburgh** — Several purchases enlivened the local market. A leading consumer bought No. 1 heavy melting at $58, up $2. The same mill bought No. 2 heavy melting at $51 and No. 2 bundles at $48. Another mill later purchased No. 1 heavy melting in a neighboring area at prices equivalent to the earlier buy.

**Philadelphia**—Steel scrap prices show continued strength. The Fairless Works of U.S. Steel recently purchased prime grades of openhearth material at $58.50, delivered, following smaller purchases elsewhere at that figure.

**New York** — Brokers' buying prices are strong, but unchanged, except in heavy breakable cast, which is holding at $48-$49. Brokers are paying $52-$53 for No. 1 heavy melting and No. 1 bundles, $42-$43 for No. 2 heavy melting and $40-$41 for No. 2 bundles.

**Boston**—Steel scrap prices reflect a firmer trend without much increase in buying. Demand for export, dock shipments, has not reached the former level. This tends to maintain a wide spread between heavy melting grades, $10 to $11 in the case of No. 1 heavy melting and No. 1 bundles.

**Buffalo**—A leading local consumer bought secondary scrap grades at $1 under prices paid previously. But the over-all market shows no sign of weakness.

**Youngstown**—Scrap is firm here. New orders are being placed for substantial tonnages. One electric steelmaker bought No. 1 heavy melting steel at $65.

**Detroit** — Despite rumors of lower prices, auto lists closed here, with scrap prices apparently holding firm. Brokers seemed a bit edgy, and indications are the local market is in for a series of minor ups and downs as auto production scheduling shakes out.

**Cleveland**—Prices on the steelmaking grades are up sharply here and in the Valley, based on sales over the past week. Advances range up to $3 a ton. The new show of strength reflects: 1. The likelihood that high steel mill operations will continue through the first quarter of next year. 2. The bullishness resulting from trouble in the Near East.

**St. Louis**—Shipments of openhearth scrap have declined substantially. Local mills are depending on their stockpiles.

**Birmingham**—Export demand is supporting prices on cast iron scrap in a weak domestic market. Domestic steel scrap appears firmer than it was, and exporters appear to be able to fill their present needs at prices that are down $2 to $3 from those of a week ago.

**Seattle**—Scrap prices have returned to two-week-ago levels. No. 1 and No. 2 heavy melting are quoted at $53 and $50. Sales are active and in good volume. Export interests continue active.

**San Francisco**—A local dealer has a contract to charter 20 tramp steamers for the transportation of up to 300,000 tons of steel scrap to Japan.

**Washington**—Stocks of ferrous materials (scrap and pig iron) held by consumers at the end of August totaled 8,349,000 gross tons, reports the Bureau of Mines. This was a slight decrease from those of the previous month and was 4 per cent less than those held on Aug. 31, 1955.

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# Iron and Steel Scrap

Consumer prices, per gross tons, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

## STEELMAKING SCRAP COMPOSITE

| | |
|---|---|
| Oct. 31 | $58.67 |
| Oct. 24 | 57.00 |
| Sept. Avg. | 59.08 |
| Oct. 1955 | 45.17 |
| Oct. 1951 | 43.60 |

**Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.**

---

## PITTSBURGH

| | |
|---|---|
| *No. 1 heavy melting* | *57.00-58.00* |
| *No. 2 heavy melting* | *50.00-51.00* |
| *No. 1 bundles* | *57.00-58.00* |
| *No. 2 bundles* | *47.00-48.00* |
| *No. 1 busheling* | *57.00-58.00* |
| Machine shop turnings | 39.00-40.00 |
| Mixed borings, turnings | 39.00-40.00 |
| Short shovel turnings | 43.00-44.00 |
| Cast iron borings | 43.00-44.00 |
| Cut structurals, 3 ft. lengths | 67.00-68.00 |
| *Heavy turnings* | *54.00-55.00* |
| Punchings & plate scrap | 67.00-68.00 |
| Electric furnace bundles | 67.00-68.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 51.00-52.00 |
| Heavy breakable cast | 49.00-50.00 |
| Unstripped motor blocks | 36.00-37.00 |
| No. 1 machinery cast | 58.00-59.00 |

### Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *67.00-68.00* |
| *Rails, 2 ft and under* | *80.00-81.00* |
| *Rails, 18 in. and under* | *81.00-82.00* |
| *Rails, random lengths* | *79.00-80.00* |
| Railroad specialties | 73.00-74.00 |

### Stainless Steel Scrap

| | |
|---|---|
| *18-8 bundles & solids* | *470.00-510.00* |
| *18-8 turnings* | *380.00-400.00* |
| 430 bundles & solids | 110.00-120.00 |
| 430 turnings | 80.00-85.00 |

## CLEVELAND

| | |
|---|---|
| *No. 1 heavy melting* | *64.50-65.50* |
| *No. 2 heavy melting* | *50.00-51.00* |
| *No. 1 bundles* | *64.50-65.50* |
| *No. 2 bundles* | *44.00-45.00* |
| *No. 1 busheling* | *64.50-65.50* |
| *Machine shop turnings* | *35.00-36.00* |
| *Mixed borings, turnings* | *38.00-39.00* |
| *Short shovel turnings* | *38.00-39.00* |
| *Cast iron borings* | *38.00-39.00* |
| *Cut foundry steel* | *59.00-60.00* |
| *Low phos.* | *65.50-66.50* |
| *Cut structural plates 2 ft and under* | *71.00-72.00* |
| Alloy free, short shovel turnings | 43.00-44.00 |
| *Electric furnace bundles* | *65.50-66.50* |

### Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *58.00-59.00* |
| *Crarging box cast* | *51.00-52.00* |
| *Heavy breakable cast* | *49.00-50.00* |
| *Stove plate* | *55.00-56.00* |
| *Unstripped motor blocks* | *37.00-38.00* |
| *Brake shoes* | *45.00-46.00* |
| *Clean auto cast* | *57.00-58.00* |
| *Burnt cast* | *44.00-45.00* |
| *Drop broken machinery* | *60.00-61.00* |

### Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *68.00-69.00* |
| *R.R. malleable* | *73.00-74.00* |
| *Rails, 2 ft and under* | *86.00-87.00* |
| *Rails, 18 in. and under* | *87.00-88.00* |
| *Rails, random lengths* | *83.00-84.00* |
| *Cast steel* | *72.00-73.00* |
| *Railroad specialties* | *77.00-78.00* |
| *Uncut tires* | *76.00-77.00* |
| *Angles, splice bars* | *78.00-79.00* |
| *Rails, rerolling* | *85.00-86.00* |

### Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| 18-8 bundles, solids | 450.00-500.00 |
| 18-8 turnings | 300.00-310.00 |
| 430 clips, bundles, solids | 115.00-120.00 |
| 430 turnings | 55.00-65.00 |

## YOUNGSTOWN

| | |
|---|---|
| *No. 1 heavy melting* | *66.00-67.00* |
| *No. 2 heavy melting* | *57.00-58.00* |
| *No. 1 bundles* | *66.00-67.00* |
| *No. 2 bundles* | *49.00-50.00* |
| *No. 1 busheling* | *66.00-67.00* |
| *Machine shop turnings* | *36.00-37.00* |
| *Short shovel turnings* | *43.00-44.00* |
| *Cast iron borings* | *41.00-42.00* |
| *Low phos.* | *68.50-69.50* |
| *Electric furnace bundles* | *68.50-69.50* |

### Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 66.00-67.00 |

## CHICAGO

| | |
|---|---|
| *No. 1 heavy melting* | *59.00-63.00* |
| *No. 2 heavy melting* | *48.00-49.00* |
| *No. 1 factory bundles* | *65.00-66.00* |
| *No. 1 dealer bundles* | *59.00-60.00* |
| *No. 2 bundles* | *43.00-44.00* |
| *No. 1 busheling* | *59.00-63.00* |
| *Machine shop turnings* | *37.00-38.00* |
| *Mixed borings, turnings* | *39.00-40.00* |
| *Short shovel turnings* | *39.00-40.00* |
| *Cast iron borings* | *39.00-40.00* |
| *Cut structurals, 3 ft* | *67.00-68.00* |
| *Punchings & plate scrap* | *68.00-69.00* |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 50.00-51.00 |
| Stove plate | 46.00-47.00 |
| Unstripped motor blocks | 39.00-40.00 |
| Clean auto cast | 55.00-56.00 |
| Drop broken machinery | 55.00-56.00 |

### Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *64.00-65.00* |
| R.R. malleable | 70.00-71.00 |
| *Rails, 2 ft and under* | *82.00-83.00* |
| *Rails, 18 in. and under* | *83.00-84.00* |
| *Angles, splice bars* | *75.00-76.00* |
| *Rails, rerolling* | *87.00-88.00* |

### Stainless Steel Scrap

| | |
|---|---|
| 18-8 bundles & solids | 505.00-515.00 |
| 18-8 turnings | 355.00-375.00 |
| 430 bundles & solids | 105.00-110.00 |
| 430 turnings | 60.00-65.00 |

## DETROIT

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 55.00 |
| No. 2 heavy melting | 41.00 |
| No. 1 bundles | 56.00 |
| No. 2 bundles | 37.00 |
| No. 1 busheling | 55.00 |
| Machine shop turnings | 31.00 |
| Mixed borings, turnings | 33.00 |
| Short shovel turnings | 34.00 |
| Punchings & plate scrap | 58.00-60.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 48.00 |
| Charging box cast | 41.00 |
| Stove plate | 42.00 |
| Heavy breakable | 41.00 |
| Unstripped motor blocks | 32.00 |
| Clean auto cast | 53.00 |
| Malleable | 52.00 |

## BIRMINGHAM

| | |
|---|---|
| No. 1 heavy melting | 42.00-43.00 |
| No. 2 heavy melting | 40.00-41.00 |
| No. 1 bundles | 42.00-43.00 |
| No. 2 bundles | 34.00-35.00 |
| No. 1 busheling | 42.00-43.00 |
| Cast iron borings | 25.00-26.00 |
| Short shovel turnings | 35.00-36.00 |
| Machine shop turnings | 33.00-34.00 |
| Bar crops and plate | 59.00-60.00 |
| Structural & plate, 2 ft. | 57.00-58.00 |
| Electric furnace bundles | 52.00-53.00 |
| Cut foundry steel | 50.00-51.00 |

### Cast Iron Grades

(F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 53.00-54.00 |
| Stove plate | 51.00-52.00 |
| Unstripped motor blocks | 46.00-47.00 |
| Charging box cast | 40.00-41.00 |
| No. 1 wheels | 45.00-46.00 |

### Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 56.00-57.00 |
| Rails, 18-in. and under | 74.00-75.00 |
| Rails, rerolling | 77.00-78.00 |
| Rails, random lengths | 69.00-70.00 |
| Angles, splice bars | 68.00-69.00 |

## PHILADELPHIA

| | |
|---|---|
| No. 1 heavy melting | 57.00-58.00 |
| No. 2 heavy melting | 48.00 |
| No. 1 bundles | 57.00-58.00 |
| *No. 2 bundles* | *46.00-48.00* |
| No. 1 busheling | 57.00-58.00 |
| Electric furnace bundles | 60.00 |
| Mixed borings, turnings | 41.00 |
| Machine shop turnings | 40.00 |
| Short shovel turnings | 44.00-45.00 |
| *Heavy turnings* | *53.00* |
| Structurals & plates | 62.00-63.00 |
| Couplers, springs, wheels | 70.00 |
| Rail crops, 2 ft & under | 77.00-80.00 |

### Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *52.00-54.00* |
| Malleable | 68.00† |
| Heavy breakable cast | 56.00-57.00 |
| Drop broken machinery | 58.00-59.00 |

## NEW YORK

(Brokers' buying prices)

| | |
|---|---|
| No. 1 heavy melting | 52.00-53.00 |
| No. 2 heavy melting | 42.00-43.00 |
| No. 1 bundles | 52.00-53.00 |
| No. 2 bundles | 40.00-41.00 |
| Machine shop turnings | 31.00-32.00 |
| Mixed borings, turnings | 31.00-32.00 |
| Short shovel turnings | 37.00-38.00 |
| Low phos. (structural & plate) | 54.00-55.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 46.00-47.00 |
| Unstripped motor blocks | 36.00-37.00 |
| *Heavy breakable* | *48.00-49.00* |

### Stainless Steel

| | |
|---|---|
| 18-8 sheets, clips, solids | 475.00-485.00 |
| 18-8 borings, turnings | 290.00-300.00 |
| 430 sheets, clips, solids | 115.00-120.00 |
| 410 sheets, clips, solids | 105.00-110.00 |

## BOSTON

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 48.00-49.00 |
| No. 2 heavy melting | 37.00-37.50 |
| No. 1 bundles | 48.00-49.00 |
| No. 2 bundles | 35.00-35.50 |
| No. 1 busheling | 48.00-49.00 |
| Machine shop turnings | 29.00-30.00 |
| Mixed borings, turnings | 31.00-32.00 |
| Short shovel turnings | 32.00-33.00 |
| No. 1 cast | 44.50-45.50 |
| Mixed cupola cast | 40.00-41.00 |
| No. 1 machinery cast | 45.50-46.00 |

## BUFFALO

| | |
|---|---|
| No. 1 heavy melting | 57.00-58.00 |
| *No. 2 heavy melting* | *44.00-45.00* |
| No. 1 bundles | 57.00-58.00 |
| *No. 2 bundles* | *41.00-42.00* |
| No. 1 busheling | 57.00-58.00 |
| Mixed borings, turnings | 34.00-35.00 |
| Machine shop turnings | 31.00-32.00 |
| Short shovel turnings | 35.00-36.00 |
| Cast iron borings | 34.00-35.00 |
| Low phos. | 60.00-61.00 |

### Cast Iron Grades

(F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 49.00-50.00 |
| No. 1 machinery | 54.00-55.00 |

### Railroad Scrap

| | |
|---|---|
| Rails, random lengths | 71.00-72.00 |
| Rails, 3 ft and under | 77.00-78.00 |
| Railroad specialties | 68.00-69.00 |

## CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 56.00-57.00 |
| No. 2 heavy melting | 45.00-46.00 |
| No. 1 bundles | 56.00-57.00 |
| No. 2 bundles | 41.00-42.00 |
| No. 1 busheling | 56.00-57.00 |
| Machine shop turnings | 35.00-36.00 |
| Mixed borings, turnings | 36.00-37.00 |
| Short shovel turnings | 39.00-40.00 |
| Cast iron borings | 36.00-37.00 |
| Low phos. 18 in. | 63.00-64.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 48.00-49.00 |
| Heavy breakable cast | 47.00-48.00 |
| Charging box cast | 48.00-49.00 |
| Drop broken machinery | 58.00-59.00 |

### Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 62.00-63.00 |
| Rails, 18 in. and under | 76.00-77.00 |
| Rails, random lengths | 68.00-69.00 |

## ST. LOUIS

(Brokers' buying prices)

| | |
|---|---|
| No. 1 heavy melting | 51.50 |
| No. 2 heavy melting | 45.00 |
| No. 1 bundles | 51.50 |
| No. 2 bundles | 41.00 |
| No. 1 busheling | 51.50 |
| Machine shop turnings | 32.00 |
| Short shovel turnings | 36.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 50.00 |
| Charging box cast | 43.00 |
| Heavy breakable cast | 43.00 |
| Unstripped motor blocks | 43.00 |
| Brake shoes | 51.00 |
| Clean auto cast | 53.00 |
| Stove plate | 43.50 |

### Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 62.50 |
| Rails, 18 in. and under | 80.00 |
| Rails, rerolling | 86.00 |
| Rails, random lengths | 77.50 |
| Angles, splice bars | 61.00 |

## SEATTLE

| | |
|---|---|
| *No. 1 heavy melting* | *53.00* |
| *No. 2 heavy melting* | *50.00* |
| *No. 1 bundles* | *50.00* |
| No. 2 bundles | 35.00 |
| Machine shop turnings | 28.00-30.00 |
| Mixed borings, turnings | 28.00-30.00 |
| Electric furnace No. 1 | 60.00-65.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 50.00-52.00 |
| Heavy breakable cast | 48.00-50.00 |
| No. 1 wheels | 37.00 |
| Unstripped motor blocks | 48.00-50.00 |
| Stove plate (f.o.b. plant) | 40.00-42.00 |

## LOS ANGLES

| | |
|---|---|
| No. 1 heavy melting | 57.00 |
| No. 2 heavy melting | 54.00 |
| No. 1 bundles | 55.00 |
| No. 2 bundles | 47.00 |
| Machine shop turnings | 32.00 |

### Cast Iron Grades

(F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 60.00 |

## SAN FRANCISCO

| | |
|---|---|
| No. 1 heavy melting | 55.00 |
| No. 2 heavy melting | 52.00 |
| No. 1 bundles | 53.00 |
| No. 2 bundles | 43.00 |
| Machine shop turnings | 35.00 |
| Mixed borings, turnings | 35.00 |
| Cast iron borings | 35.00 |
| Heavy turnings | 35.00 |
| Short shovel turnings | 38.00 |
| Cut structurals | 62.00 |

### Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 60.00 |
| Charging box cast | 45.00-47.00 |
| Stove plate | 48.00 |
| Heavy breakable cast | 42.00 |
| Unstripped motor blocks | 50.00 |
| Clean auto cast | 60.00 |
| No. 1 wheels | 48.00 |
| Drop broken machinery | 60.00 |

## HAMILTON, ONT.

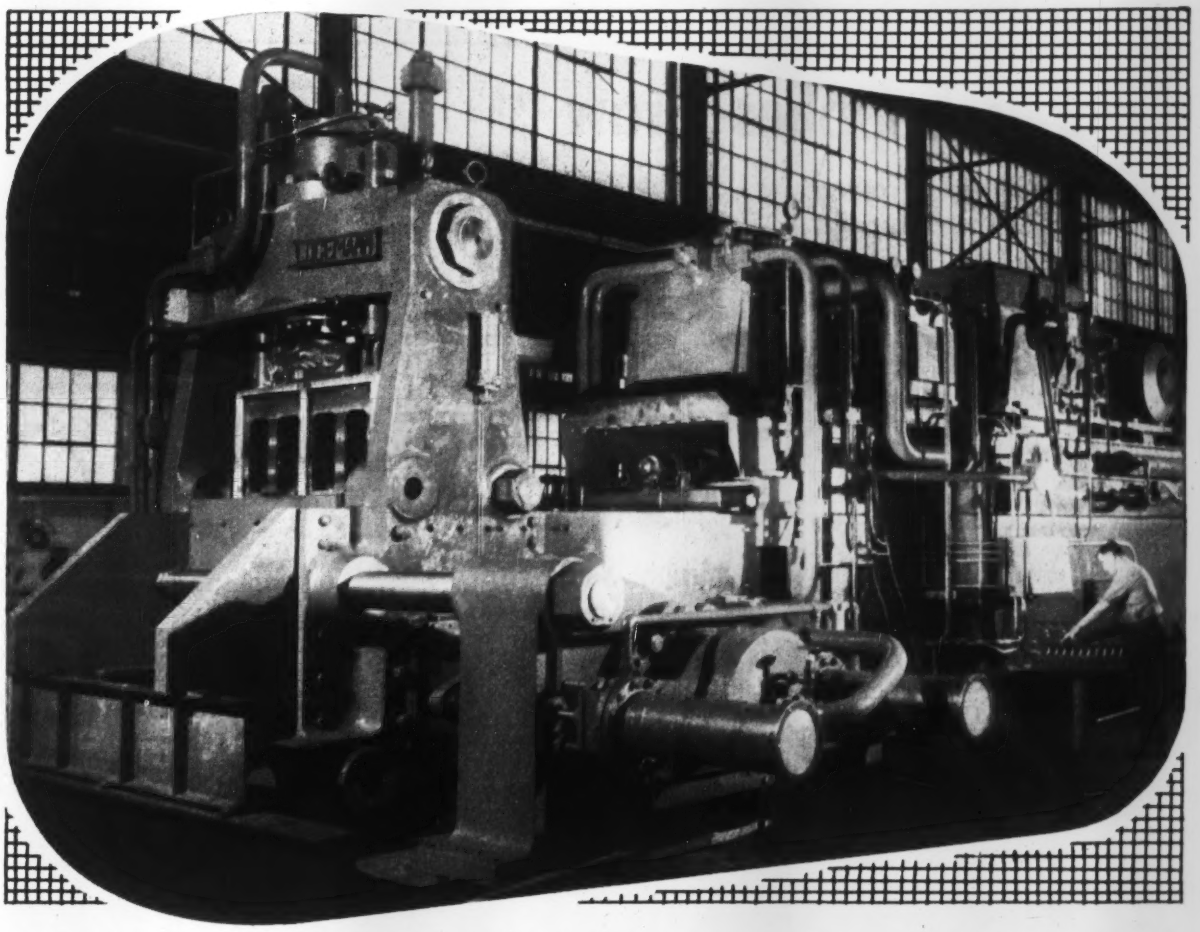
| | |
|---|---|
| No. 1 heavy melting | 52.00 |
| No. 2 heavy melting | 47.00 |
| No. 1 bundles | 52.00 |
| No. 2 bundles | 40.50 |
| Mixed steel scrap | 46.00 |
| Busheling, new factory: Prepared | 50.00 |
| Busheling, new factory: Unprepared | 46.00 |
| Short steel turnings | 35.00 |

### Cast Iron Grades†

| | |
|---|---|
| No. 1 machinery cast | 50.00 |

---

†F.o.b., Hamilton, Ont.



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OPERATION IS ENTIRELY AUTOMATIC. The supervising operator, with his electrical control-board, can be remotely located. In some cases, a closed circuit television screen is used to show operator the loading of press and hopper.

It will pay you to investigate the merits of this new unit. When making your inquiry, please give us the amount of tonnage required, and the nature of your scrap.

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# Copper Supplies Grow

**Primary producers of copper want a stable price of 36 cents a pound. The total supply will show gains as new production is brought in throughout next year**

*Nonferrous Metal Prices, Pages 202 & 203*

U.S. PRIMARY copper producers will attempt to stabilize the price of the metal at 36 cents a pound.

They say: 1. It is reasonable, compared with the price of competitive metals. 2. Depreciation of the buying power of the dollar makes it almost comparable to the prewar price of 12.5 cents. 3. A stabilized price at 36 cents should bring in new and/or expanded business from old customers.

**Adjustments** — While primary producers are beginning to get back to more normal production cycles (one major producer is cutting back from a 6½ to a 6-day work week for its miners), there is going to be no shortage or artificial pricing result. Producers are carrying nearly normal inventories for the first time in two years and will be able to service any influx of orders.

Comment: "The drop by primary producers to 36 cents a pound displayed sound thinking," says an industry observer. "It told users that the primary copper people did not intend to battle with custom smelters who were quoting 35 cents. If primary producers had gone to 35 cents, many users might have held off ordering new tonnages, hoping for further price drops."

**Brass Mills**—It is still too early to tell, but there are indications that better business is on the way. Orders from Detroit are still far from satisfactory, but some gains are being made. Comments one brass mill executive: "We have hit our low, and we have no place to go but up."

## Aluminum Sales Firm

Aluminum sales continue on a high plateau. As 1957 automobiles are introduced, it becomes apparent that each model will carry substantially more aluminum than last year's when the average was 35 lb a car.

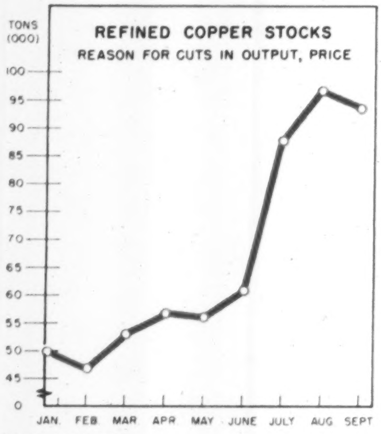
Samples: It is being used for such things as instrument panels, pistons, grille assemblies, components for power steering and automatic transmissions. After final results are in, look for the average to hit the 55-lb mark.

Aluminum men are pointing to the first quarter of 1957 as a bellwether for the industry. If sales spurt, there will be an equaling of supply and demand. If sales stay on the current high plateau, producers will turn their attention to developing new markets. Comments one aluminum man: "We have to have extra metal available before we can sell it for new applications."

Outlook: Aluminum supply may outstrip demand for the remainder of the fourth quarter.

## Lead, Zinc Sales Jump

Lead and zinc men report good to excellent sales. Zinc diecasters are still hesitating to order on more than a short term basis, but galvanizers are adding stability to the market.



Source: Copper Institute

Lead sales to the tetraethyl lead and cable industries continue at peak levels. Battery makers are still an important factor.

## Tin Market Zooms

Middle East tension sent the domestic tin price skyrocketing to $1.13 a pound last week. Industry observers point out that there was some speculative buying and that several dealers had to rush into the market to get enough tin to cover sales already consummated.

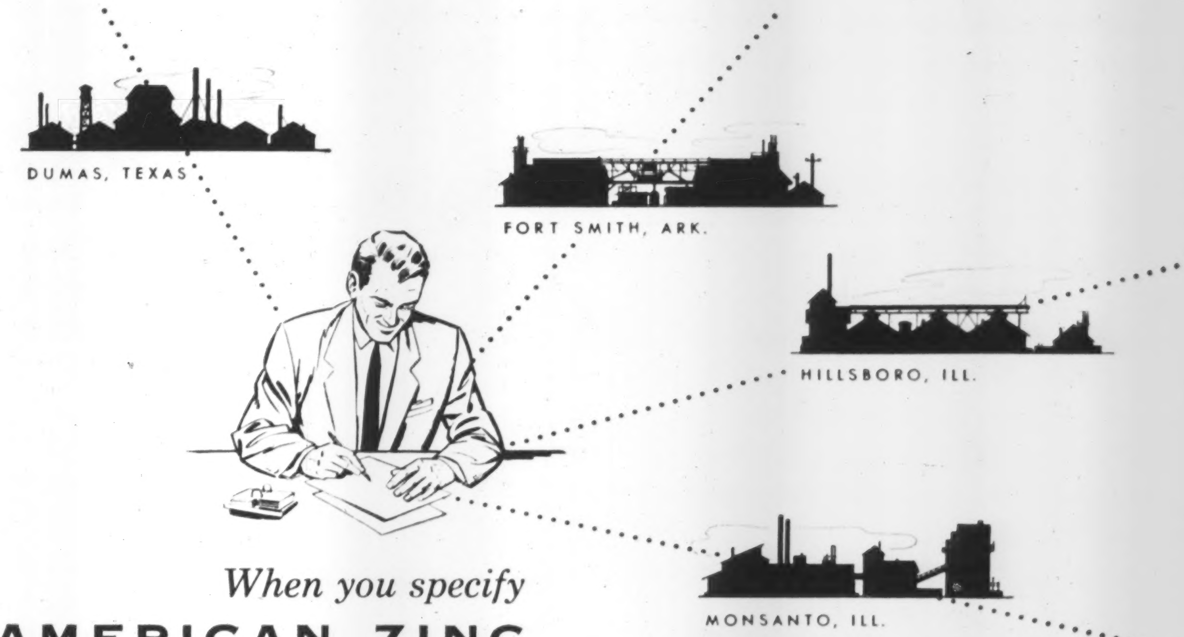
## Market Memos

- While the industry keeps expanding, the military uses for titanium are growing so rapidly that there may be little of the metal left to develop additional civilian uses.
- Rumors persist that the Office of Defense Mobilization is seriously considering granting a company funds to get into the nickel business. This would be in addition to guaranteeing a market and remuneration for unusual costs.

### NONFERROUS PRICE RECORD

| | Price Oct. 31 | Last Change | Previous Price | Sept. Avg. | Aug. Avg. | Oct., 1955 Avg. |
|---|---|---|---|---|---|---|
| Copper ..... | 36.00 | Oct. 31, 1956 | 35.00-36.00 | 39.500 | 39.750 | 44.594 |
| Lead ...... | 15.80 | Jan. 13, 1956 | 16.30 | 15.800 | 15.800 | 15.300 |
| Zinc ........ | 13.50 | Jan. 6, 1956 | 13.00 | 13.500 | 13.500 | 13.020 |
| Tin ........ | 112.50 | Oct. 30, 1956 | 110.50 | 103.745 | 99.043 | 96.230 |
| Nickel ..... | 64.50 | Nov. 24, 1954 | 60.00 | 64.500 | 64.500 | 64.500 |
| Aluminum .. | 27.10 | Aug. 10, 1956 | 25.90 | 27.100 | 26.700 | 24.400 |
| Magnesium . | 35.25 | Aug. 13, 1956 | 33.75 | 35.250 | 34.694 | 32.500 |

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.


DUMAS, TEXAS
FORT SMITH, ARK.
HILLSBORO, ILL.
MONSANTO, ILL.

*When you specify*
## AMERICAN ZINC
*you have*
## 4
## SOURCES OF SUPPLY

Not just one, but four American Zinc plants are at your service. Under normal conditions each of these plants is prepared to make immediate delivery of slab zinc. If, for any reason one of the plants is unable to fill your order, another one will.

To further assure prompt delivery, and to keep pace with growing demand, production of all grades of zinc, from Prime Western to Electrolytic, has been increased.

You can always count on American Zinc to fill your needs with speed and precision.

### HERE'S WHY WE CAN SERVE YOU BETTER

| PLANT | BRAND | GRADE |
|---|---|---|
| DUMAS, TEXAS | GRANBY D | Prime Western<br>Select<br>Brass Special<br>Continuous Line Galvanizing Grades |
| FORT SMITH, ARK. | GRANBY A<br>AMERICAN SPECIAL | Prime Western<br>Brass Special |
| HILLSBORO, ILL. | GRANBY H | High Grade<br>Intermediate<br>Brass Special<br>Prime Western<br>Continuous Line Galvanizing Grades |
| MONSANTO, ILL. | AMERICAN ELECTROLYTIC | Special High Grade<br>High Grade<br>Special Alloys and Shapes<br>Continuous Line Galvanizing Grades |

**American Zinc sales Company**

*Distributors for* AMERICAN ZINC, LEAD & SMELTING COMPANY

COLUMBUS, OHIO • CHICAGO • ST LOUIS • NEW YORK

# Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

## PRIMARY METALS AND ALLOYS

**Aluminum:** 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

**Aluminum Alloy:** No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

**Antimony:** R.M.M brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

**Beryllium:** 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

**Beryllium Aluminum:** 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

**Beryllium Copper:** 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

**Bismuth:** $2.25 per lb ton lots.

**Cadmium:** Sticks and bars, $1.70 per lb deld.

**Cobalt:** 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

**Columbium:** Powder, $119.20 per lb, nom.

**Copper:** Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

**Germanium:** First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

**Gold:** U.S. Treasury, $35 per oz.

**Indium:** 99.9%, $2.25 per troy oz.

**Iridium:** $90-$110 nom. per troy oz.

**Lead:** Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

**Lithium:** 98 + %, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

**Magnesium:** Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

**Magnesium Alloys:** AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

**Mercury:** Open market, spot, New York, $255-$257 per 76-lb flask.

**Molybdenum:** Extruded ingot, $9.60 per pound, f.o.b. Detroit.

**Nickel:** Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

**Osmium:** $80-$100 per troy oz, nom.

**Palladium:** $23-$24 per troy oz.

**Platinum:** $103-$108 per troy oz from refineries.

**Radium:** $16-$21.50 per mg radium content, depending on quantity.

**Rhodium:** $118-$125 per troy oz.

**Ruthenium:** $45-$55 per troy oz.

**Selenium:** 99.5%, $13.50-$15 per lb.

**Silver:** Open market, 91.375 per troy oz.

**Sodium:** 16.50, c.l.; 17.00, l.c.l.

**Tantalum:** Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

**Tellurium:** $1.50-$1.75 per lb.

**Thallium:** $12.50 per lb.

**Tin:** Straits, N. Y., spot, 112.50; prompt, 112.25.

**Titanium:** Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

**Tungsten:** Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

**Zinc:** Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

**Zirconium:** Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

## SECONDARY METALS AND ALLOYS

**Aluminum Ingot:** Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 24.00-24.50; 5% silicon alloy, 0.60 Cu max, 26.00-27.00; 13 alloy, 0.60 Cu max, 26.00-27.00; 195 alloy, 26.00-27.50; 108 alloy, 24.00-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

**Brass Ingot:** Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

**Magnesium Alloy Ingot:** AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

## NONFERROUS PRODUCTS

### BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy) Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

### COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.355; l.c.l., 41.98. Weatherproof, 30.000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

### LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

### TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

### ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

### ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

### NICKEL, MONEL, INCONEL

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheets, C.R. .......... | 113 | 97 | 118 |
| Strip, C.R. ........... | 111 | 99 | 128 |
| Plate, H.R. .......... | 107 | 96 | 111 |
| Rod, Shapes, H.R. ... | 94 | 80 | 99 |
| Seamless Tubes ...... | 144 | 120 | 190 |

### ALUMINUM

**Sheets and Circles:** 1100 and 3003 mill finish (30,000 lb base; freight allowed)

| Thickness Range, Inches | Flat Sheet | Coiled Sheet |
|---|---|---|
| 0.249-0.136 | 40.90-45.40 | .... |
| 0.135-0.096 | 41.40-46.50 | 37.70-39.60 |
| 0.095-0.077 | 42.10-48.30 | 37.80-39.80 |
| 0.076-0.061 | 42.70-50.60 | 38.20-40.50 |
| 0.060-0.048 | 43.40-52.90 | 38.80-41.50 |
| 0.047-0.038 | 43.90-55.60 | 39.60-42.90 |
| 0.037-0.030 | 44.30-50.00 | 40.40-44.70 |
| 0.029-0.024 | 44.90-52.40 | 41.00 |
| 0.023-0.019 | 45.80-52.20 | 42.00 |
| 0.018-0.017 | 46.60-53.30 | 42.60 |
| 0.016-0.015 | 47.50-53.90 | 43.40 |
| 0.014 | 48.50-50.90 | 44.40 |
| 0.013-0.012 | 49.70-52.10 | 45.10 |
| 0.011 | 50.70-53.70 | 46.30 |
| 0.010-0.0095 | 52.10-54.40 | 47.60 |
| 0.009-0.0085 | 53.40 | 49.10 |
| 0.008-0.0075 | 55.00 | 50.03 |
| 0.007 | 56.50 | 51.80 |
| 0.006 | 58.10 | 53.20 |

### ALUMINUM (continued)

**Plates and Circles:** Thickness 0.250-3 in. 24-60 in. width or diam, 72-240 in. lengths.

| Alloy | Plate Base | Circle Base |
|---|---|---|
| 1100-F, 3003-F .... | 40.2 | 44.5 |
| 5050-F. ............ | 41.3 | 45.6 |
| 3004-F ............ | 42.3 | 47.5 |
| 5052-F ............ | 42.9 | 48.2 |
| 6061-T6 ........... | 44.4 | 50.0 |
| 2024-T4* .......... | 48.1 | 54.4 |
| 7075-T6* .......... | 55.4 | 62.5 |

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*24-48 in. widths or diam, 72-180 lengths.

**Screw Machine Stock:** 30,000 lb base.

| Diam. (in.) or | —Round— | | —Hexagonal— | |
|---|---|---|---|---|
| across flats | 2011-T3 | 2017-T4 | 2011-T3 | 2017-T4 |
| **Drawn** | | | | |
| 0.125 | 74.30 | 71.50 | .... | .... |
| 0.156-0.172 | 63.00 | 60.40 | .... | .... |
| 0.188 | 63.00 | 60.40 | .... | 76.40 |
| 0.219-0.234 | 59.70 | 57.20 | .... | .... |
| 0.250-0.281 | 59.70 | 57.20 | .... | 73.00 |
| 0.313 | 59.70 | 57.20 | .... | 69.60 |
| 0.344 | 58.50 | .... | .... | .... |
| **Cold-finished** | | | | |
| 0.375-0.547 | 58.80 | 57.50 | 70.10 | 65.50 |
| 0.563-0.688 | 58.80 | 57.50 | 66.70 | 61.60 |
| 0.750-1.000 | 57.40 | 56.00 | 61.00 | 58.10 |
| 1.063 | 57.40 | 56.00 | .... | 56.10 |
| 1.125-1.500 | 55.20 | 53.90 | 59.00 | 56.10 |
| **Rolled** | | | | |
| 1.563 | 53.70 | 52.40 | .... | .... |
| 1.625-2.000 | 53.10 | 51.60 | .... | .... |
| 2.125-2.500 | 51.70 | 50.30 | .... | .... |
| 2.563-3.375 | 50.20 | 48.70 | .... | .... |

**Forging Stock:** Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

**Pipe:** ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90.000-lb base, per 100 ft.

| Nom. Pipe Size (in.) | | Nom. Pipe Size (in.) | |
|---|---|---|---|
| ¾ | $18.45 | 2 | $ 57.00 |
| 1 | 29.00 | 4 | 157.20 |
| 1¼ | 39.25 | 6 | 281.65 |
| 1½ | 46.95 | 8 | 423.80 |

**Extruded Solid Shapes:**

| Factor | Alloy 6063-T5 | Alloy 6062-T6 |
|---|---|---|
| 9-11 | 45.90-47.50 | 61.50-65.80 |
| 12-14 | 46.20-47.70 | 62.20-66.80 |
| 15-17 | 46.40-48.30 | 63.50-68.50 |
| 18-20 | 47.00-48.80 | 65.50-71.10 |

### MAGNESIUM

**Sheet and Plate:** AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60 Tooling plate, .250-3.0 in., 73.00.

**Extruded Solid Shapes:**

| Factor | Com. Grade (AZ31C) | Spec. Grade (AZ31B) |
|---|---|---|
| 6-8 | 69.60-72.40 | 84.60-87.40 |
| 12-14 | 70.70-73.00 | 85.70-88.00 |
| 24-26 | 75.60-76.30 | 90.60-91.30 |
| 36-38 | 89.20-90.30 | 104.20-105.30 |

## NONFERROUS SCRAP

### DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

**Aluminum:** 1100 clippings, 14.00-14.50; old sheets, 11.00-11.50; borings and turnings, 7.50-

## BRASS MILL PRICES

| | MILL PRODUCTS a | | | | SCRAP ALLOWANCES f | | |
|---|---|---|---|---|---|---|---|
| | Sheet, Strip, Plate | Rod | Wire | Seamless Tube | Clean Heavy | Rod Ends | Clean Turnings |
| Copper ................ | 57.63b | 54.86c | .... | 57.82 | 32.000 | 32.000 | 31.250 |
| Yellow Brass .......... | 49.44 | 40.17d | 49.98 | 52.35 | 24.625 | 24.375 | 22.625 |
| Low Brass, 80% ....... | 52.65 | 52.59 | 53.19 | 55.46 | 27.375 | 27.125 | 26.625 |
| Red Brass, 85% ....... | 53.79 | 53.73 | 54.33 | 56.60 | 28.500 | 28.250 | 27.750 |
| Com. Bronze, 90% ..... | 55.48 | 55.42 | 56.02 | 58.04 | 29.500 | 29.250 | 28.750 |
| Manganese Bronze ...... | 57.13 | 51.23 | 61.47 | .... | 23.000 | 22.750 | 22.250 |
| Muntz Metal .......... | 51.44 | 47.25 | .... | .... | 23.125 | 22.875 | 22.375 |
| Naval Brass .......... | 53.39 | 47.70 | 60.45 | 56.55 | 23.000 | 22.750 | 22.250 |
| Silicon Bronze ......... | 61.44 | 60.63 | 61.48 | 63.36 | 31.250 | 31.000 | 30.250 |
| Nickel Silver, 10% ..... | 65.16 | 69.20g | 67.49 | .... | 30.125 | 29.875 | 15.063 |
| Phos. Bronze, A, 5% ... | 76.25 | 76.75 | 76.75 | 77.93 | 33.000 | 32.750 | 31.750 |

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 11.00-11.50; industrial castings, 11.00-11.50.

**Copper and Brass:** No. 1 heavy copper and wire, 25.25-25.75; No. 2 heavy copper and wire, 23.75-24.25; light copper, 21.25-21.75; No. 1 composition red brass, 23.50-24.00; No. 1 composition turnings, 22.50-23.00; yellow brass turnings, 15.00-15.50; new brass clippings, 20.50-21.00; light brass, 14.00-14.50; heavy yellow brass, 15.00-15.50; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 17.00-17.50; cocks and faucets, 17.50-18.00; brass pipe, 19.00-20.00.

**Lead:** Heavy, 12.50-13.00; battery plates 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.50-14.50.

**Monel:** Clippings, 80.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 80.00-90.00.

**Nickel:** Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00 rod ends, 130.00-195.00.

**Zinc:** Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

### REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

**Aluminum:** 1100 clippings, 18.00-19.00; 3003 clippings, 18.00-19.00; 6151 clippings, 18.00-19.60; 5052 clippings, 18.00-18.50; 2014 clippings, 17.00-18.50; 2017 clippings, 17.00-18.50; 2024 clippings, 17.00-18.50; mixed clippings, 17.00-17.50; old sheets, 15.50-16.00; old cast, 15.50-16.00; clean old cable (free of steel), 18.00; borings and turnings, 15.75-16.75.

**Beryllium Copper:** Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

**Copper and Brass:** No. 1 heavy copper and wire, 31.00; No. 2 heavy copper and wire, 29.50; light copper, 27.25; refinery brass (60% copper) per dry copper content, 26.00.

### INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

**Copper and Brass:** No. 1 heavy copper and wire, 31.00; No. 2 heavy copper and wire, 29.50; light copper, 27.25; No. 1 composition borings, 25.50-26.00; No. 1 composition solids, 26.00-26.50; heavy yellow brass solids, 17.50-18.00; yellow brass turnings, 17.50; radiators, 20.00-20.50.

## PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

### ANODES

**Cadmium:** Special or patented shapes, $1.70 per lb.

**Copper:** Flat-rolled, 54.29; oval, 53.42, 5000-10,000 lb; electrodeposited, 45.78; 2000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

**Nickel:** Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

**Tin:** Bar or slab; less than 200 lb, 128.50; 200-499 lb, 127.00; 500-999 lb, 126.50; 1000 lb or more, 126.00.

**Zinc:** Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

### CHEMICALS

**Cadmium Oxide:** $1.70 per lb, in 100-lb drums.
**Chromic Acid:** Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

**Copper Cyanide:** 100-1000 lb, 80.50.
**Copper Sulphate:** 500-1900 lb, 21.15; 2000 lb and over, 18.65.

**Nickel Chloride:** 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

**Nickel Sulphate:** 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

**Sodium Cyanide:** Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

**Sodium Stannate:** Less than 100 lb, 76.20; 100-600 lb, 67.40; 700-1900 lb, 64.90; 2000-9900 lb, 63.20; 10,000 lb or more, 62.00.

**Stannous Chloride (anhydrous):** Less than 25 lb, 174.40; 25 lb, 139.40; 100 lb, 124.40; 400 lb, 122.00; 5200-19,600 lb, 109.80; 20,000 lb or more, 97.60.

**Stannous Sulphate:** Less than 50 lb, 136.80; 50 lb, 106.80; 100-1900 lb, 104.80; 2000 lb or more, 102.80.

**Zinc Cyanide:** Under 1000 lb, 55.55; 1000 lb and over, 53.55.

**EDITOR**

National metalworking magazine has opening for young man as an assistant editor. Industrial and/or writing experience helpful. Should be able to talk with top level management and production executives. Unlimited opportunity for advancement in pay, prestige and job satisfaction. Tell us about your education, experience and ambitions. Box 482, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Career opportunities are available for qualified men with at least two (2) years experience in Time Study for Incentive Development, Methods Analysis and/or Standard Cost. Background of steel operations desirable. Interview and relocation allowances. Prompt consideration will be given all replies. Submit resume to:

**PERSONNEL DIRECTOR**
**GREAT LAKES STEEL CORPORATION**
**Ecorse, Detroit 29, Mich.**

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Are you interested in a challenging opportunity as a technical writer and editor with leading national metalworking magazine? We have an opening for a young man, preferably with mechanical or metallurgical degree. Experience with steel mill or steel mill equipment builder helpful. Tell us about your education, experience, personal situation and ambitions. Box 483, STEEL, Penton Bldg., Cleveland 13, Ohio.

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1000 to 1500 Ton
Hobbing Press
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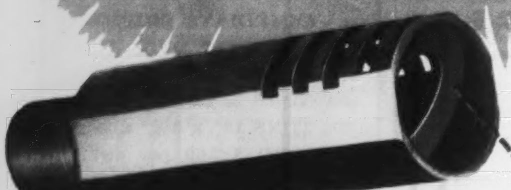
**Penton Bldg. Cleveland 13, Ohio**

EASY-FLO brazed baffle takes 15,000 psi wallops by the thousands!

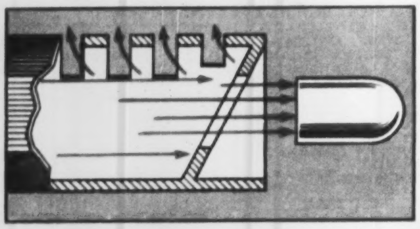


The LEE "muzzle brake" is proof positive of EASY-FLO brazing's amazing strength and ability to take it.

LEE Muzzle Brakes are made by LEE MFG. CO. Wheelwright, Mass.

ATTACHED to the business end of a .22 or .45 automatic, the muzzle brake counteracts the upward kick of the barrel. A slanting baffle does it. The sketch shows how. The baffle is brazed in the brake with the low-temperature silver brazing alloy — EASY-FLO.

WHEN USED on a .45 automatic the baffle takes a *trip-hammer gas pressure blow up to 15,000 psi at every shot.* Thousands of these muzzle brakes are in use, mainly by "target shooters" which means that most of them are subjected to the terrific shock of discharge thousands of times a year. Yet, in the more than 2 years these brakes have been on the market, not a single failure has been reported.



Gas pressure hitting the slanting baffle exerts a downward force that cuts the muzzle jump of a .45 automatic over 50%.

PUT EASY-FLO BRAZING INSURANCE IN YOUR METAL JOINING...

BULLETIN 20 tells why EASY-FLO brazing insures joints in both ferrous and non-ferrous metals that are *virtually indestructible* – also why EASY-FLO brazing is surprisingly fast and economical. Write for a copy today.

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UPSON-WALTON

turnbuckles you can depend on

Weldless, hex-end bodies are drop forged from special bar quality forging steel.

Heads are drilled and tapped in perfect alignment, so that end fittings pull evenly.

Threading is American National Course series, class 2 fit, for easy assembly.

*In the long run quality costs less. Specify Upson-Walton turnbuckles.*

ENGINEERED FOR SAFETY

For prompt service call your U-W Distributor. Write for free catalog on wire rope fittings.

THE UPSON-WALTON COMPANY
12500 ELMWOOD AVENUE
CLEVELAND 11, OHIO
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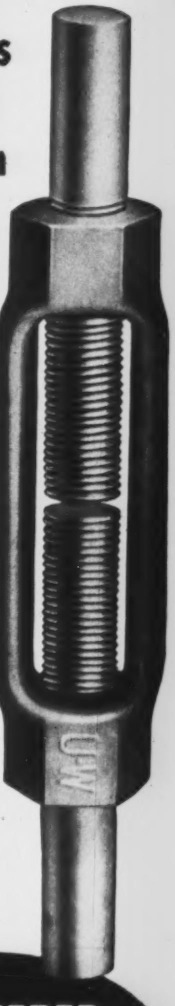
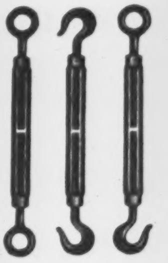
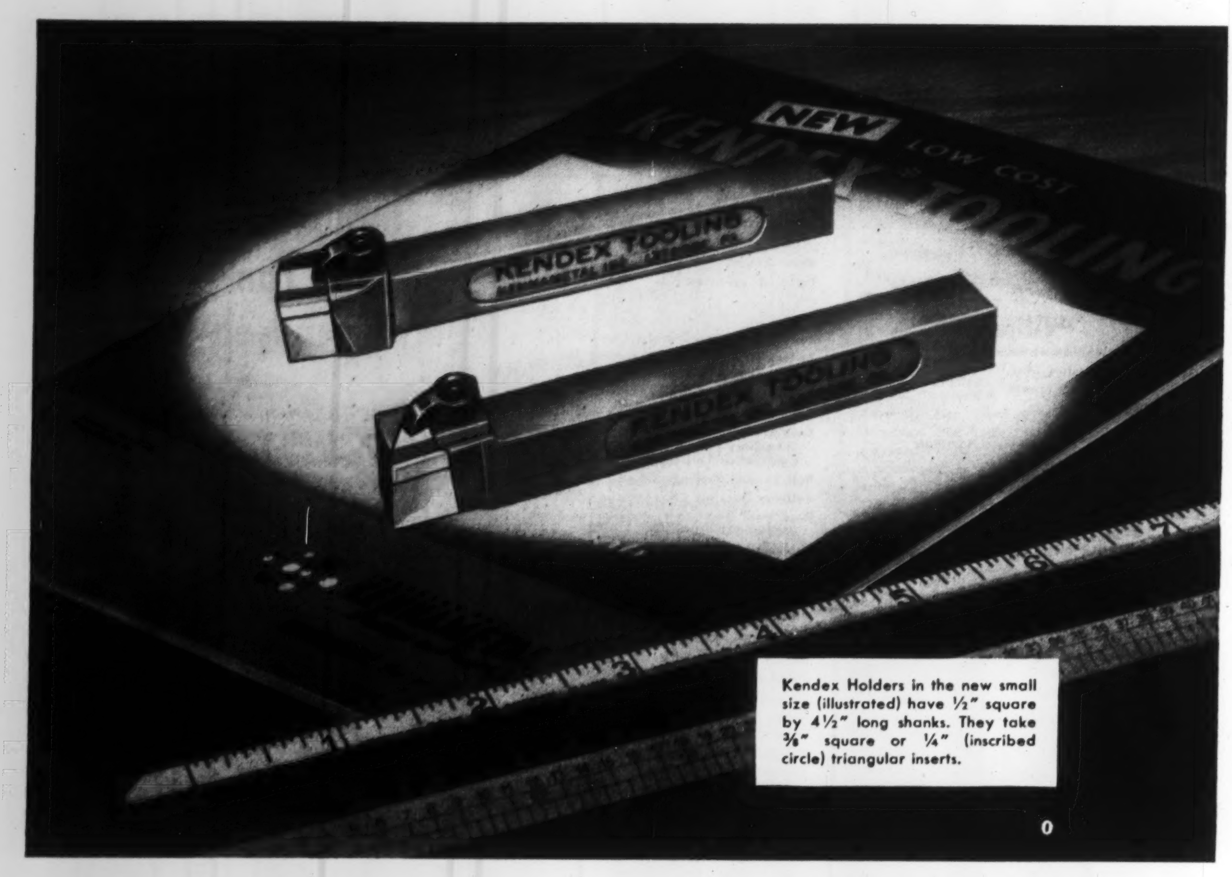
MANUFACTURERS OF TACKLE BLOCKS, WIRE ROPE, ROPE FITTINGS • ESTABLISHED 1871





ROPE FITTINGS
UPSON WALTON



Kendex Holders in the new small size (illustrated) have ½" square by 4½" long shanks. They take ⅜" square or ¼" (inscribed circle) triangular inserts.

# NOW, small Kendex* Button Tools with turnover "throw-away" inserts

## ...for light machining on high production operations
## ...especially useful for boring operations

Another variation of the popular Kendex Tooling is now available. This is the new ½" Kendex Holder, available in four styles, for use with triangular or square Kennametal* "turn-over" button inserts . . . making available small tools with the many advantages and economies of the Kendex principle:

- grinding is eliminated
- inserts are indexed quickly to each new cutting edge
- machine downtime is reduced to a minimum
- production is increased

If you are interested in small-sized, rugged, dependable clamped-type tooling, ask your Kennametal tool engineer to show you how these small Kendex holders can be used to advantage on your operations. Or write for Booklet 301. KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered Trademark

8-5975

Small-sized Kendex Tools are equipped with Kennametal chip breakers and solid Kennametal seats to back up inserts.

Kennametal inserts for small Kendex holders are stocked in a number of grades including the new K7H grade for high velocity operations and for machining heat-treated or high tensile steels.

Tell us your small-tool problem and our tool engineers will help you select the right tool and grade of cutting edge.

MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS

INDUSTRY AND
**KENNAMETAL**
*...Partners in Progress*

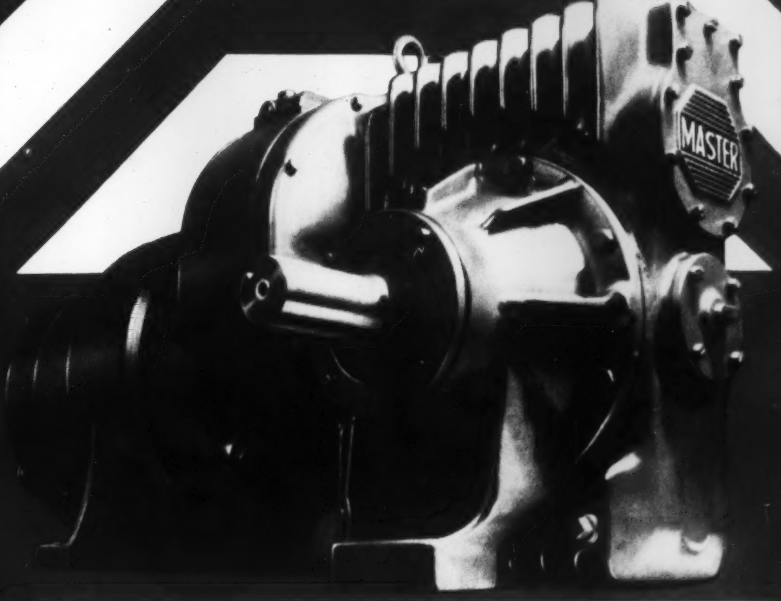
ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

MASTER

**still the All-American First**

Master Gearmotors have given more millions of hours of satisfactory service in the field than all other makes combined.



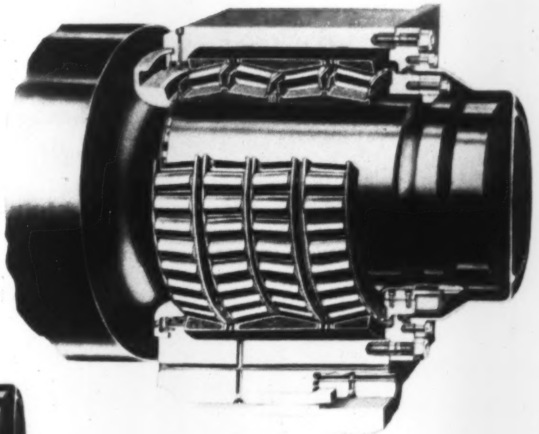
CONTINUOUS LIFE TESTING
MAINTAINS
CUSTOMER SATISFACTION

How can *we* help YOU?

For five years without stopping, these two 326 frame single reduction gearmotors were run continuously 24 hours a day at full load, one as an induction generator, the other as a gearmotor. When shut down and inspected, Master's conservative design showed *gear wear of less* than .001″.

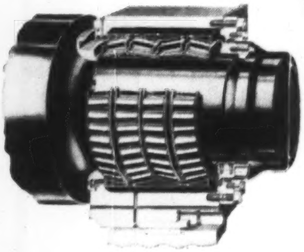
**THE MASTER ELECTRIC COMPANY • Dayton 1, Ohio**

# TIMKEN® bearings used on rolling mill roll necks



1956

561 mills



1950

317 mills

1933

45 mills

## Look how this idea has grown in 23 years!

JUST 23 years ago—in 1933—there were 45 mills using Timken bearing-equipped stands. Today, 1354 Timken bearing-equipped stands are used in 561 mills . . . more than eleven times as many mills as in 1933.

Why has the idea of using Timken® tapered roller bearings on mill roll necks become so widely adopted? For all these reasons:

1. **LOW BEARING COST.** Tonnage records indicate that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled to a minimum.
2. **GREATER MILL RIGIDITY.** Balanced proportion design of Timken bearings permits larger roll necks than ever before possible with tapered roller bearings.
3. **ELIMINATION OF COMPLICATED LUBRICATING SYSTEMS.** Timken bearings permit use of simple grease lubrication.
4. **LOAD RATINGS INCREASED UP TO 40%** due to Timken bearings' balanced proportion design.
5. **NO SPECIAL THRUST BEARINGS NEEDED.** Timken tapered roller bearings take both radial and thrust loads.
6. **MILLS CAN BE STOPPED AND RESTARTED WITH NO LOSS OF STEEL.** Timken bearings permit starting under full load.
7. **HIGHER ROLLING MILL SPEEDS** are possible because Timken bearings minimize friction.
8. **PROLONGED ROLL LIFE** is assured because Timken bearings provide maximum roll neck strength, less wear.

You can be sure of all these advantages in either existing or new equipment by specifying Timken tapered roller bearings for back-up and work rolls. Consult our roll neck bearing specialists for full details. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*

**TIMKEN** TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.